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9. ABSTRACT
This paper is organized into four major sections: "Survey on Communal Feeding;" "Food and Nutrient Intake Studies on Pregnant, Lactating Women and Weaning Children;" "Nutrient Intake Level of the Average Rural Resident;" and "An Overview of Research on the Nutritional Status of Koreans." Communal Feeding(CF) is relatively new. It appeared two years ago and spread rapidly with the enthusiastic support of rural residents. Food and nutrient intake was surveyed by the precise weighing method on 524 participants of four CF villages from three provinces in Korea. Meals that the CF program provided to farmers supplied enough calories and all other nutrients, except riboflavin, to sustain them in the intensive work of harvesting. Surveys of pregnant, lactating women and weaning children in rural Korea indicated that their diet was generally unbalanced. Mean daily intakes of calories, niacin, thiamine, and ascorbic acid exceeded the recommended allowances for pregnant and lactating women, but vitamin A, calcium, and riboflavin intake was low. All nutrient intakes by the weaning children were deficient, particularyly in animal protein, calcium, iron, vitamin A, riboflavin, and vitamin C. The following recommendations are made: that the government decide that an adequate nutrition for all people is an appropriate national goal and set up a national nutrition policy; that special attention should be paid to the nutritional status of vulnerable groups such as pregnant, lactating women and weaning children; that the government should initiate the formulation, production, and distribution of weaning foods; that instruction in nutrition should be included in elementary school curriculum; that CF program should be encouraged and extended; and that consideration should be given to fortification of appropriate commodities with vitamin A, riboflavin, calcium and iron.

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FOOD AND NUTRIENT INTAKE STUDIES OF RURAL POPULATION IN KOREA

1. Communal Feeding
1. Pregnant, Lactating Women and Weaning Children
1. Nutrient Intake Level of the Average Rural Resident

August 1977

KOREAN STATISTICAL ASSOCIATION

FOOD AND NUTRIENT INTAKE STUDIES OF RURAL POPULATION IN KOREA

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August 1977

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FOREWORD

The provision to every individual of a quality and quantity of food which will permit him to achieve his full physical and mental potential is a primary concern of many people.

Individual food and nutrient consumption with particular reference to the high risk population groups of rural Korea was assessed from October to December 1976 on 279 subjects.

The Communal Feeding Program - a relatively new scene appeared to rural life was examined and evaluated. The farm household food expanditure survey has been conducted by the Ministry of Agriculture and Fisheries for over a decade and these data are found to be a good source for evaluating food and nutrient intake level of rural population.

We wish to thank U. S. Agency for International Development for providing financial assistance. We wish to express our thanks for the cooperation received from the Ministry of Agriculture and Fisheries. We also wish to thank the Central Office of Agricultural Cooperatives for their substantial help in Communal Feeding survey. Special thanks are due to Dr. James R. Brady and others in the health and population office of USAID/KOREA. Our sincere thanks are due to the many field survey agents and Sae Ma Eul Women's Club member of Communal Feeding villages.

We are deeply grateful to Mrs. Geong Ja Paik whose untiring efforts and interest made this study possible.

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SUMMARY

The findings of the studies conducted on the following 3 parts may be summarized briefly as follows:

Part I. Survey on Communal Feeding

The Communal Feeding is relatively new scene appeared a couple years ago and spreading rapidly with enthusiastic support of rural residents. Food and Nutrient intake was surveyed by the precise weighing method on 524 participants of 4 CF villages from 3 provinces in Korea.

Two meals that the communal feeding program provided to farmers under the intensive work of harvesting was supplying enough calories and all other nutrients except the riboflavin. There was variation among the CF villages but overall the nutrient intake was good and had balanced meals.

Part II. Food and Nutrient Intake Survey on Special Groups (Pregnant, lactating women and weaning children of rural Korea).

The results of food and nutrient intake survey on 93 each pregnant, lactating and weaning children in rural Korea indicated that, in general, a large quantity of unbalanced diet was consumed regularly.

Their dietary pattern was not different from ordinary Korean diet.

Mean daily intakes of calorie, niacin, thiamine and ascorbic acid exceeded the recommended allowances for pregnant and lactating women but vitamin A, calcium and riboflavin intake was low.

All nutrients intake by the weaning children in rural Korea were deficient. Particularly low were animal protein, calcium, iron, vitamin A, riboflavin and vitamin C meeting only 10% - 40% of the recommended level.

Part III. Food and Nutrient Intake of rural residents obtained from year around farm household food expenditure survey.

The food expenditure portion of the Farm Household Economy Survey contucted by MAF in 1976 was analyzed to obtain an average daily food and nutrient intake level of rural residents.

The result compared well with the National Nutrition Survey result of MHSA, food balance sheet and with other reported values.

RECOMMENDATIONS

1. It is strongly recommended and urged that the government decide that an adequate nutrition for all people is an appropriate national goal and set up a national nutrition policy.
2. Special attention needs to be paid upon the nutritional status of vulnerable groups - pregnant, lactating women and weaning children of rural Korea.
3. It is recommended that the government initiate the formulation, production and distribution of weaning foods for 6 months to 36 month old children.
4. Instruction in nutrition should be included in the elementary school curriculum.
5. It is recommendable to extend the ongoing Applied Nutrition Project of Office of Rural Development.
6. The communal Feeding Program organized by the Agricultural Cooperatives be encouraged and extended.
7. Fortification of appropriate regular commodity with vitamin A, riboflavin, calcium and iron may be seriously considered and examined.

General Survey on Communal Feeding Practice in South Korean Villages

There are 34,665 villages in Korea. Seven percent of these villages, and the number is growing rapidly, are practicing so called "Gong Dong Chwi Sa (Communal Feeding)" in rural Korea.

Six hundred and seventy five villages were randomly selected and the questionaire forms were mailed out to the women leaders of the villages. (See Appendix A for the questionaire form). The questionaire forms were designed to obtain the general pattern of the Gong Dong Chwi Sa, the management, the attitudes, and knowledge on nutrition.

Three hundred and forty nine villages, 14% of all the Communal Feeding Practicing villages returned the forms with answer.

The general characteristics of villages participating in Communal Feeding are shown in Table 1. It is noted from Table 1 that the average size of CF practicing village is approximately 30 to 70 households, and about 71 percent of the villagers participate the Communal Feeding Program.

A majority of the villages operate the CF to feed the cooperative farm workers only, although some villages include the workers plus their family.

Table 1. General characteristics of villages participating in Communal Feeding in rural Korea

N=349

		Percent of total CF villages			Percent of Total
Size of CF Villages	30-50 households	40 %	CF participants	Cooperative farm workers only	65 %
	50-70 "	32		Workers and their family	23
	70-90 "	15		Any body who wants to participate	12
	over 90 "	12			
	under30 "	1			
Percentage of participating household-	100 %	14	meals served	Lunch only	17
	over 80 %	34		Snack-lunch	13
	over 60 %	41		Lunch-snack	16
	under 50 %	12		Snack-lunch-snack	38
				Breakfast-snack-lunch-snack-supper	7
				Variable	7
CF operating season	rice-planting season	100	av. No. of persons served per meal	20 persons	14
	weeding	12		40 "	51
	harvesting	41		60 "	24
	village festivals	36		80 "	8
				over 100	2
CF started	a year ago	60	place of meals prepared and served	At field	30
	1-2 years ago	25		Building	58
	2-3 years	9		Prepared in building and served at field	12
	over 3 years	7			

All villages surveyed have the CF during the rice-planting season. Less than half the villages operate the CF during the Fall harvesting days.

It was also noted that villagers eat together when there is a village festival such as, sports, games with neighboring villages full moon days etc.

The foods are prepared in the community building and served to 40 to 60 people at one meal. Although the frequency of meals served varies from village to village a snack-lunch-sanck pattern is most popular.

Over 80% of the CF villages started the program less than 2 years ago, although there are 23 villages that had been operating the CF for over 3 years.

Table 2 shows the management and operational details of Communal Feeding.

The Communal Feeding is mostly managed by the Sae Ma Eul Women's Club of Agricultural Cooperatives.

A few villages surveyed had a combined work team coming from Sae Ma Eul Women's Club of AC and the Life Improvement Club of Office of Rural Development.

The Gong Dong Chwi Sa runs for 10 to 30 days a year. During the busy season, work is usually done systematically, in that villagers work together for one family, than move to next family's field. The expense for the CF is normally met

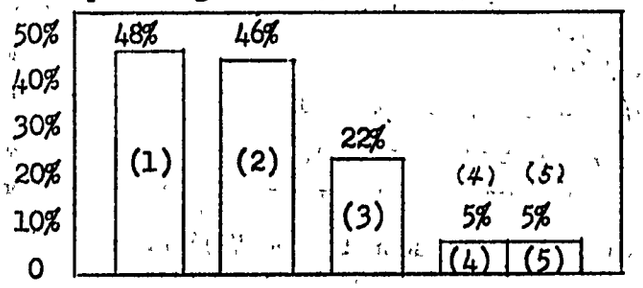
Table 2. Management and Operational details of CF practice in rural Korea

(349 villages sampled)

Manager	Sae Ma Eul Woman's Club	76%	Fuels used	Wood	88 %
	Life Improvement Club (ORD)	0		Briquette	21
	Cooperation by both Clubs	24		P. Gas	17
				Electricity	4
				Methane	0.9
				Straw	0.3
Cook	Club members-rotational serve	57	Drinking water sources	Well	40
	One fixed member with helpers	37		Pump	36
	Paid worker	7		Tap water	30
				Stream	1.2
Yearly operated for	Less than 10 days	19	Food purchasing method	Participants bring farm products from home and purchase together 34	
	10-20	37		Manager collects the anticipated expense from the participants and account the real expense afterwards 21	
	20-30	32			
	over 40	13			
Expense	Employer	69			
	Employee	21			
	Paid jointly	10			
External aids provided mainly by AC and ORD	Building	8		Manager supplies the foods first with the village funds and participants pays later 14	
	Cooking facilities	77			
	Food supply	6			
	None	13		Empolyer pays everything 13	

by the employer of the day. The cooking facilities are usually provided by the agencies (AC and ORD)

Figure 1 shows the order of emphasis placed by villagers when meal planning for CF.



(1) Nutritious food
(2) Accustomed food
(3) Easy to fix
(4) Delicious and appealing
(5) Cheap food

Fig. 1. Order of emphasis placed by villagers when meal planning for CF.

It is interesting to note that people think of nutritious food first and the cheap food last. It may be recalled that traditionally Korean farmers eat the best during the busy working season.

Table 3 shows that the villagers consider the Communal Feeding to be very economical since it saves them working hours and food expenses.

Table 3. Views on Communal Feeding expressed by Villagers

(N = 349)

More economic due to prolonged working hours	43 %
Saves food expenses	31 %
Strengthened cooperative spirit among villagers	18 %
More farm wives can work longer at field	6 %
Good opportunity to learn about the nutrition	1.5 %

Table 4. Needs in CF program seen by the Villagers

(N = 349)

More villagers should be interested in CF	71 %
Needed more convenient cooking facilities	60 %
Recommendable to have a guidance on management, menu planning and cookery	37 %
Food storage is a problem	32 %

They also feel that through CF activity, villagers strengthen the cooperative and sharing spirit among themselves.

Many villagers surveyed thought more people should be interested in CF, there is a need for improved cooking facilities and a well trained guide in management and menu planning etc. (Table 4)

It is not difficult to see at this point that the Communal Feeding can serve as a field station for nutrition education to rural people. We know that nutrition condition could be greatly improved through the diffusion of nutrition education.

For instance, soybean, small fish, and greens that are commonly available at household level even in remote villages could be easily prepared into valuable supplementary foods for infants and children if the mothers knew their importance and learned the proper preparation methods.

In Summary,

The Communal Feeding is a relatively new phenomena, appearing a few years ago and spreading rapidly.

Villagers are enthusiastic about it and very cooperative.

It has a positive aspect in that the management is done autonomously. The Communal Feeding may be used as an excellent field station of nutrition education for rural areas in Korea.

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Nutritional Survey on Communal Feeding in Rural Korea

Unlike many developing countries the increased wealth of Korea with her national economic growth rate of 10% is not concentrated in a few unities. It is Government policy to raise rural incomes so that these now equal or slightly exceed those of urban worker.

The improved standard of living in rural area must have a considerable impact on nutritional states of rural folks. The Ministry of Health and Social Affairs has been concertrating their efforts in the prevention of communicable diseases and family planning. We know that infections have an effect on malnutrition and nutritional status has an effect on infections.

Therefore it would be much more efficient and effective if the efforts to control the communicable diseases are combined with the efforts to improve the nutritional status. The simultaneous presence of both malnutrition and infection will result more serious consequences than the additive effect of the two working independently. In other words, infections make malnutrition worse and poor nutrition increases the severity of

infectious diseases, family planning and the improvement of nutrition deserve a high priority in development and should be instituted together since they will be mutually reinforcing.

For the first time in Korean history, the rural population became a minority in 1975. The labor force is short in busy farming season, as a consequence, farmers began to think the most effective way of using their labor force. The Communal Feeding program, initiated by the Agricultural cooperatives, and operated for last couple of years is widley supported by the farmers themselves and is spreading rapidly through out the country, Additional calorie will be needed during this intensive work period. There has been a numerous nutritional surveys on rural residents in the past but no study was made on farmers during the busy farming seasons. Furthermore, the Communal Feeding practice is relatively new scene in Korea but spreading rapidly, influencing the food pattern and nutrient intake.

The Communal Feeding practice was convenient in that one can easily go in and weigh every food they eat together at the CF place. Four villages that practice CF were selected from Kyung Ki Do, Kang Won Do and Chulla Nam Do. We made a reconaissence visit to these villages, met the village and CF program leaders and trained them in advance.

Survey Method and analysis

The nutritional survey was carried out by the precise weighing method. All food served in the Communal Feeding program were weighed for 3 consecutive days, in raw form and after cooking is done. Later the left-overs were weighed. The nutrient contents of each food consumed by the CF participants were obtained from the Food analysis Table.(*) All these 4 villages had the mass feeding meals twice a day mid-morning and midafternoon. The subjects ate breakfast and supper at home but this was not included in the survey. We will for convenience call two meals taken in CF as a daily nutrient intake of these people. Daily Nutrient intake per adult was obtained by applying converting factor to "Standard adult" (25 years old man).

Results and Discussion

1. General Characteristics of the subjects

Table 1 shows the age and sex distribution of subjects participated in Communal Feeding in four Korean villages.

Table 1. Age and Sex distribution of subjects participating in Communal Feeding in 4 Korean Villages.

Age	Village / Sex	Yongsan (A)	Hupyung (B)	Yongdu (C)	Yongdu (D)	Total
20-40	M	29	126	65	6	226
	F	6	70	26	78	180
50-65	M	21	28	43	3	95
	F	11	6	6	0	23
Total		67	230	140	87	524

Seventy eight percent of total 524 subjects were 20-49 Years of age and 22% of the subjects were 50-65 years old. On the average more men worked in the field than women. However in Yong Du Village of Cholla Nam Do, 78 women participated while only 9 men participating. All nutrient intake of these study were compared with the Recommended Dietary Allowances of Korean FAO (1975).

Table 2 shows the converting factor of these subjects nutrient intake to standard adult rate.

Table 2. Factors of converting the Nutrients intake of 4 CF Villagers to Standard adult rate.

Nutrient / Village	Energy	Protein	V.A	V.B_1	V.B_2	Niacin	V.C	Ca	Fe
A	0.89	0.94	1.0	0.88	0.89	0.89	0.96	1.19	1.07
B	0.90	0.95	1.0	0.89	0.90	0.89	0.94	1.06	1.24
C	0.90	0.95	1.0	0.89	0.90	0.90	0.96	1.14	1.15
D	0.76	0.89	1.03	0.74	0.77	0.74	0.85	1.01	1.72
Mean	0.86	0.93	1.01	0.85	0.86	0.85	0.93	1.10	1.29

By applying the converting factors one can express the nutrient intake level to standard adult unit, regardless of the difference in age and sex distribution between the villages. The results may be compared with other existing data. However it needs to be pointed out that by applying the converting factor, the results will be over or underestimated in the range of 35%-58%. For example, in the case of village D, where 78 women and 9 men participated in the CF, the converting factor is 0.76. The total energy intake of this village was 2724 Kcal per person per two meal day. When we apply the converting factor of 0.76 to express the total calorie intake per adult, the value becomes 3585 Kcal, 32% higher than 2724 Kcal. (See Table 4 and 5)

The extent of under or over estimation will be different among studies according to the sex and age distribution and the level of the intake of the nutrients.

Since most published data are presented as "per adult" comparison is meaningful only when studies were compared with a fair margin in mind, and general pattens are being looked for.

2. Food Intake Study

Table 3 shows the amount of food consumed at 4 CF villages.

The result is compared with Park's report since his survey was on the nutrient intake level of the average farmers. His study was also carried out at about the same time of the year as this study. The total amount of food consumed per CF participant in 2 meal a day was 1456 g which is about 23 % more than national average for rural residents.
The cereal consumption was about the same but meats, fishes, and vegetables were consumed a great deal more in Communal Feeding meals than in national average farmers meal. Twenty four grams to 66 g, average 47 g of meat, 53 g of fish, were consumed in 2 meals a day CF while Park reported that average farmer consumed 8.7 g of meat and 30 g of fish a day. Customarily farmers eat well during the busy farming seasons in Korea. Therefore the meals prepared for Communal Feeding are "special food" for them and thus tend to prepare more than ordinary days. No fruits were consumed in CF, instead green and yellow vegetables were consummed in large quantity. Fats and oils were used in limited quantity but recommendable to increase the consumption of fats 5-10% more than present.

As Table 8 shows, total grain consumption, largely as rice was about 45 % of total foods. This is slightly lower

than national average of 53%.

In summary, more foods were consumed in two meal a day CF than average daily home meal in villages. The increase in total food amount was largely from meats, fishes and vegetables and not from the grains. The soybean consumption was about the same level as national average but recommendable to use in large quantity as an inexpensive nutritious food source.

3. Energy and other nutrient intake

Energy and nutrients intake per person per two meal a day in 4 CF villages are shown in Table 4.

The converting factors were applied to the Table 4 to obtain Table 5 which shows the energy and nutrients intake per adult basis.

A) Energy

There are some differences in total caloric intake among CF villages, but an average of 3100 kcal were consumed per adult per 2 meal a day. This meets 97% of recommended level for adult who is engaged in heavy physical work. (see Fig. I) The subjects eat their breakfast and supper at home. So if we consider these two meals in addition to CF meals, the total caloric intake will be for exceeding the recommended level.

Table 3. Composition of Food Consumption in Four Communal Feeding Villages (C.F.V) arranged by 5 basic food groups.

Villages / Food Groups	A	B	C	D	Mean	Park's
	(g)	(g)	(g)	(g)	(g)	**
I. Meats(and egg**)	60	65	37	24	46	8
Fishes and Shells	45	53	24	87	52	30
pulses	51	33	89	43	54	79
Sub-Total	157	152	151	154	153	118
II. Fruit	0	0	0	0	0	118
Yellow & Green Vegetables	322	186	390	415	328	303
Other Vegetables	130	572	211	137	263	48
Sub-Total	453	758	601	553	591	354
III. Rice	213	593	489	407	426	476
Barley	65	78	89	146	94	74
Noodle, Wheat	233	0	83	0	79	9
Potatoes	0	20	30	166	54	71
Others	0	0	2	3	1	0
Sub-Total	513	693	695	722	655	631
IV. Small Fishes	20	815	13	20	3	4
Sea weed	0	15	15			
Bone, Pork	23	0	0	0	5	5
Sub-Total	43	24	28	20	26	12
V. Vegetable Oil	1	2	8	7	4	
Sesame seed	0	0	0	6	1	
Sub-Total	1	2	9	13	6	6
Alcohol	1850	0	0	255	526	
Total	1169	1631	1486	1462	1456	1123

* Alcohol was excluded from total food intake.

Table 4. Energy and Nutrients Intake per Person per Two meals in Four Communal Feeding Villages.

Nutrients / Villages	Energy (kcal)	Protein (g)	Fat (g)	V.A. (I.U)	V.B1 (mg)	V.B2 (mg)	Niacin (mg)	V.C (mg)	Ca (mg)	Fe (mg)
A	2446	87.0 (11.8)	26.4	2441	1.72	1.46	50.26	158	965	27.84
B	2730	119.0 (34.6)	40.3	1769	2.25	1.41	34.72	203	882	22.39
C	2735	105.9 (20.9)	35.8	2798	1.96	1.26	41.34	173	1061	24.68
D	2724	103.5 (37.2)	34.5	6012	2.46	1.73	48.42	187	1168	29.15
Mean	2659	103.8	34.3	3255	10.15	1.46	46.18	180	1019	25.88

* ( ) = Animal protein

Table 5. Energy and Nutrients intake per adult per Two meals in Four C.F. Villages.

Nutrients / Villages	Energy (kcal)	Protein (g)	Fat (g)	V.A. (I.U)	V.B_1 (mg)	V.B_2 (mg)	Niacin (mg)	V.C (mg)	Ca (mg)	Fe (mg)
A	2748	92 *(12)	26	24'1	1.95 (1.36)	1.64 (1.47)	56.47 (38.0)	164 (82)	811	26.0
B	3033	125 (36)	40	1709	2.53 (1.77)	1.57 (1.41)	50.25 (42.71)	216 (108)	832	18.1
C	3039	111 (22)	36	2798	2.20 (1.54)	1.40 (1.20)	45.93 (39.04)	181 (90)	931	21.5
D	3584	116 (42)	34	5836	3.32 (2.32)	2.25 (2.02)	65.43 (55.61)	220 (110)	1156	17.0
Mean	3101	111 (28)	34	3211	2.50 (1.75)	1.71 (1.54)	54.52 (46.34)	195 98	932	20.5
R.D.A. (Perday)	3200	80 (27)	-	2000	1.60	1.92	21.12	60	500	10.0

* ( ) = animal protein

( ) = After deduction of cooking loss

B -30%, B -10%, Niacin-15%, V.C- 50%.

Table 6. Compares the nutrient intake of subjects who participated in CF to other reported values since 1970. With exception of vitamin A, all nutrients were consumed more in CF than the reported values. The reported values were taken from the various publication presented since 1970 including MHSA reports on nutrient intake survey of rural residents.

Table 6. Comparison of Nutrient Intake of CF Villagers with other rural residents reported since 1970.

Nutrient	CF Villagers	Reported Values
Calorie (Kcal)	3100	2394-3020
Protein (g)	111	58- 80
Fat (g)	34	13- 25
Calcium (mg)	933	413- 583
Iron (mg)	21	10- 18
Vitamin A (I.U.)	3212	2085-6143
Thiamine (mg)	2.5	1.09-1.59
Riboflavin (mg)	1.7	0.76-1.60
Niacin (mg)	54.5	14- 21
Ascorbic Acid (mg)	196	63- 114

Percentage distribution of energy among protein, fat and carbohydrate in four CF Villages is shown in Table 7.

Table 7. Percentage Distribution of Energy among protein, fat and carbohydrate in 4 CF Villages.

Nutrient	CF villages	National average (MHSA 1974)	Recommended
Protein	15.5	11.8	12
Carbohydrate	73	82	76
Fat	11.4	6.3	12

In general the distribution of energy in CF villages was very close to the recommended pattern. It is noted in particular the carbohydrate contributed only 73% total caloric intake in CF meals whereas the national average is 82%. The contribution of fat to total energy is almost twice of that national average.

Table 8 shows the percentage distribution of total amount of food, energy and some nutrients among five basic food groups consumed by 4 CF villages.

About 74% of total calorie came from cereals, meats, fishes, pulses contributed about 9% of energy, fats and oils contributed only 2% of total energy. It is well known that sufficient intake of total calorie enhances the utilization of protein and other nutrients in body.

B) Protein, fat and carbohydrate.

The subjects of this study are engaged in heavy manual work of harvesting during this survey period. In Communal Feeding,

Table 8. Percentage Distribution of total amount, Energy and some nutrients among 5 basic food groups consumed by 4 CF villages.

Food Groups	Total amt.	Energy	Protein	V.A	$V.B_1$	$V.B_2$	Niacin	V.C	Ca	Fe
Meats, fishes and pulses	11	9	25	0.7	13	21	28	0.2	21	24
Vegetables	41	8	14	72	21	46	27	95	41	27
Rice, Barley and other cereals.	45	74	51	-	64	23	41	4	20	41
Small fish, sea weeds, milk.	2	2	9	26	2	10	4	0.7	17	8
Fats and oils.	0.5	2	0.4	-	0.3	-	0.2	-	1	1

average 111 g of protein was consumed per adult per two meal day. This is a lot more than reported values of 58 g - 80 g and corresponds to 140 % recommended requirement for heavy worker. Twnety eight grams of protein was obtained from animal foods. This is slightly over the one third level of recommended amount of total protein (80 g).

It is generally agreed that one third of the total protein intake coming from animal sources can provide the best amino acid requirement of the body. It has been repeatedly pointed out that the Korean diet falls short of this animal protein requirement. In this study, 13%-36% of total protein was obtained from animal sources. Fifty one per cent of total protein was from cereals and next highest contribution was by meats, fishes and pulses, which mounted to about 25%. Excessive protein intake is not recommendable either as the extra protein metabolize into caloric use and the calorie from protein then becomes rather expensive one.
However in this study, protein contributed about 16% of total coloric intake which is about the right level. Total fat intake was almost twice the national average. It is now well known that excessive fat intake is detrimental to health.
These farmers however are engaged in heavy physical work, and the extra calorie needed may be supplied from fat by increasing the fat intake to 5-10 % more than the present level.
If fat is not increased, the extra energy is furnished from mainly grains or vegetables - which tend to expand the stomach and accelerate the stomach emptying-consequently feels hunger easily.

Carbohydrate contributed 73 % of total caloric intake.

C) Vitamins.

As presented in Table 6, the intake of Vitamins C, B, B_1 and niacin was all higher than the reported values. However Riboflavin, the nutrient most frequently pointed to be deficient to Koreans, was low at the level of 80% of the recommended requirement. Nevertheless the riboflavin intake was 1.7 mg--- higher level than all reported values. Dairy products are excellent sources of riboflavin. But rural people toaclitionaly do not consume the dairy products. The present study which will be presented under different title of this report, showed that less than 10% of total weaning children had actually consumed milk.

As Fig.1 shows, all other nutrients, except the riboflavin, was consumed well over the recommended level. Energy distribution pattern was good, food was balanced and sufficient in quantity. Yet the riboflavin intake was only 80% of recommended requirement which may be indicating that without the consumption of dairy product it is actually dufficult to meet the recommended level in rural area. Vitamin A was expressed as an International Unit Vitamin A activity from -- carotene with the application of biological utilization factor of $\frac{1}{3}$.
Usually vitamin C consumption varies from season to season. In this study, Communal Feeding meal provided 195 mg, much higher than reported values of 73 mg-114 mg. As mentioned earlier, there was no fruits served in CF, thus the vitamin C

came all from vegetables.

D) Calcium and Iron.

Both calcium and Iron intake was well over the recommended level. The calcium was mainly from vegetables and iron from grains.

There are basic studies that claim minerals are absorbed much better when supplied with good quality protein foods rather than with vegetable foods. Vegetables contain phytate and oxalate that combine. With calcium or iron and tend to form insoluble salt thus resulting in poor absorption at intestional wall.

Summary

Four Communal Feeding Villages from 3 provinces in Korea were selected. The food and nutrient intake of 524 participants were measured by the precise-weighing method for three days from October 7-16 1976. The results are summarized as follows:

1. General characteristics of the participants.

A) Age of the participants: 20-49 years old 78%
50-65 " " 22%

B) Sex of the participants: man 61%
woman 39%

C) The Communal Feeding meals were offered twice a day.

2. Food Intake :

A) Total amount of food consumed per participants per two meal day was 1456 grams, greater than national average.

B) Forty five percent of the total food was cereal, 41% vegetables, meats, fishes and pulses contributed 11%.

C) Average consumption of rice: 426 g
barley : 95 g
Noodles: 79 g

D) Average grain consumption was about the same as the national average but the consumption in vegetables, meats and fishes was higher in CF meals.

3. Calorie and Nutrient Intake:

A) Average caloric intake was 3102 kcal, 73% this came from carbohydrate, 16% from protein and 11% from fat.

B) Average protein intake was 111 g. of this 27 g was from animal sources.

C) Vitamins, calcium and iron intake was all sufficient except the riboflavin.

D) Riboflavin intake was 1.4 mg-2.5mg, average 1.7 mg which is about 80% of the recommended level.

In conclusion,

Two meals that the communal feeding program provided to farmers under the intensive work of harvesting were supplying enough calories and all other nutrients except the riboflavin. There was variation among the CF villages but overall the nutrient intake was good and had balanced meals.

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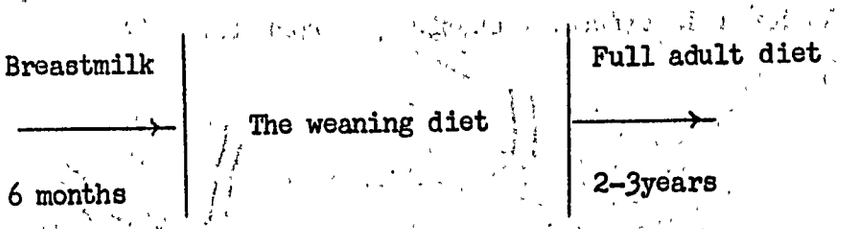
Nutritional Intake of Weaning Children in rural Korea

Introduction

Infants grow most rapidly during the first 4 to 6 months of life. Nutrient requirements are most critical in this period, during which nutritional dificiencies can have lasting effects on growth and development.

Breastmilk alone is not sufficient for the child's growing needs of both calories and protein beyond about 6 months. Besides, breastmilk production usually declines at about this time. The small amounts of protective nutrients contained in breastmilk are sufficient in the early months of life but can not meet the baby's needs after about 6 months. Full adult diet is normally taken from 2 to 3 years of age. The weaning diet, the rtansitional diet that covers period from 6 months to 2 to 3 years of age is very important and problematic.



Several studies(1-4) on the weaning practice pattern in rural Korea reported that 70 %- 80% infants are breastfed. Rhee(3) reported that the introduction of the weaning food to these breastfed infants begins between 9 months to 15 months. However the feeding pattern is irregular and only a few kind

of foods, such as rice gruel, or soft-cooked rice are given.

Anthropometric measurements of Korean children revealed that the growth rate curve of Korean infants falls well on the WHO standard for the pacific Region up to 5 months of age, but deviates from the standard curve thereafter.

Anemia among weaning and preschool children had been reported in significant number of children. Average vaccination rate for children is known to be low. Breastfeeding continues to two to three years of age. All these related studies suggested that the nutritional status of young Korean children may not be good.

However no study was found that directly measures the actual nutrient intake level of these weaning children in rural Korea. We have attempted to measure the level of nutrient intake of weaning children in rural Korea.

Method

Ninety three rural children, 8 months to 36 months of age were randomly selected from Kyung Ki Do and Choong Chung Nam Do. These two provinces are known to be the national average in farm household income.

Thirty experienced enumerators of the National Farm Household Economy Survey and the Production Cost Survey of the Ministry of Agriculture and Fisheries conducted the dietary survey. They used the combination of precise-weighing and

interview method.

Each survey agent, trained in advance, visited 3 farm houses with weaning children at each meal for two days. The agent weighed the raw materials just before cooking and measured the amount of the dish after cooking. The agent than recorded the portions of each dish each household member had eaten with the weaning child in mind. The amount of food consumed by the weaning child is converted into the weight of raw materials.

It was then analyzed for intakes of calories, protein, calcium, iron, Vitamin A, thiamine, riboflavin and Vitamin C. Standard tables of food composition (Korean FAO) were used in the calculations. The daily intake for each child for each of the 8 nutrients was compared with the Recommended Dietary Allowances for Korean children. The anthropometric measurements included the body weight and height. They were then compared with the national average.

Results and Discussion

1. General Characteristics of the Subjects.

The age and sex distribution of 93 subjects is shown in Table 1. Sixty four percent of these rural children were completly weaned by 18 months of age, by 2 years of age, 92% had been weaned. Table 2 shows the average size of the cultivated land owned by the sample households. It shows a very similar distribution trend as national average.

Eighty one percent of the subjects' father aged 25 to 40 years while 64% of the mothers were in their 20's, 29% in 30's and 6.5% of children's mother were in their 40's. (Table 3).

The majority of the subjects' mothers had received six years of formal education while fathers received slightly more. (See Table 4) Average family size of the subjects was 4 to 9.

Table 1. Age and Sex Distribution of 93 Rural Infants and Toodlers

Sex \ Age Group (Mo.)	8-12	12-24	24-36	Total
Male	11	10	24	35
Female	5	12	30	47
Total	16	22	54	93

Table 2. Percentage in Size of Cultivated hand in Sample Household

Unit = %

Age Group(Mo.) \ Size	Under0.5 (JeongBo)	0.5-1.0 (JeongBo)	1.0-1.5 (JeongBo)	1.5-2.0 (JeongBo)	over2.0 (JeongBo)	Total
8-12	5.4	9.8	2.2	0	0	17.4
12-24	5.4	7.6	6.5	1.1	3.3	23.9
24-36	7.6	23.9	20.7	5.4	1.1	58.7
Total	18.4	41.3	29.4	6.5	4.4	100

* 0.1 Jeong-Bo = 0.25 acre

Table 3. Age Distrubution of Parents

Unit = %

Parents / Age(Yr.)	Mother	Father
20-25	19.6	4.6
25-30	44.6	26.4
30-35	17.4	36.8
35-40	11.9	17.3
over 40	6.5	14.9
Total	100	100

Table 4. Education Level of Parents

Unit = %

Parents / Education	Mother	Father
Illiterate	3.3	1,1
Literate	1.1	3.3
Primary School	70.3	44.6
Middle School	20.9	22.8
High School	4.4	22.8
College	0	5.4
Total	100	100

2. Anthropometry

Table 5. Weight and Height Distribution of subjects Investigated Compared with Korean Standard

Age in Month	Sex	No. of Subjects	Weight(kg) Mean±S.D	Korean Std. Range	Height(cm) Mean±S.D	Korean Std. Range
8-12	M	11	9.27±1.20	8.43-9.43	71.6±3.9	70.8±78.0
	F	5	8.97±1.18	8.06-9.42	68.4±3.6	69.6±76.0
13-18	M	5	10.18±2.61	9.83-10.79	80.0±6.8	78.0±82.4
	F	5	9.90±1.51	9.42-10.25	76.2±3.6	76.0±80.3
19-24	M	8	11.12±0.74	10.79-12.34	83.6±2.5	82.4±87.4
	F	8	11.0±0.64	10.25-11.80	81.6±2.5	80.3±86.2
25-30	M	16	12.56±2.20	12.34-12.34	87.1=3.5	87.4±87.4
	F	15	11.29±0.59	11.80-86.0	86.0±1.9	86.2±86.2
31-36	M	10	12.80±1.42	12.34-13.02	89.7±4.1	87.4±90.8
	F	10	12.08±1.95	11.80-12.59	88.6±2.8	86.2±89.2

The mean body weight and height of the 93 subjects are within the Korean standard range for rural children. Since the subjects were randomly selected among rural children and this study does not involve any treatment to the subjects, this is expected.

3. Food consumption and Nutrient Intake

An average amount of daily food intake for rural weaning children aged 8 months up to 36 months was obtained. Table 6 presents this result along with the percentage of children consumed the various food groups during the survey period. About 44 percent of the 8-12 months old children have not started supplementary food. They were raised only with mothers milk. But studies have shown that mothers' milk alone is not sufficient to these age children. After one year of age, all children surveyed were supplimented at least with rice. The total amount of food intake was increasing as children get older. Only 5-10% of the total foods was animal arigin. Table 6 clearly shows the dietary pattern of the weaning children. They are consuming a very limited variety of foods every meal.

We arbitrarily call it "Diet K" and it consists of
rice
kimchi (cabbage or radish)
seasoning (soysauce, bean paste, red pepper)
sesame seed or oil

Table 7 shows the number of children who only consumed the simple "Diet K"

Table 6. Daily Food Intake per Capita and Percentage of total subjects consumed the Food.

Month / Item / Food Group	8-12		12-24		24-36	
Cereals	Amt.(g)	%	Amt.(g)	%	Amt.(g)	%
Cereals	94	56	153	100	218	100
Sugars	0	0	1	14	3	18
Potatoes	2	6	14	27	54	48
Pulses	3	6	10	45	7	37
Vegetables	4	19	37	91	65	100
Fruits	20	19	21	23	33	37
Sea-weeds	0	0	1	23	0	15
Seasonings	8	44	8	77	7	96
Vegetable oil	1	13	1	64	1	66
Egg	10	25	10	32	6	20
Fishes	1	6	11	27	7	24
Milks	0	0	9	18	3	4
Meats	0	0	0	9	1	8
Total veg. Foods	132	-	246	-	388	-
Total Ani. Foods	11	-	30	-	17	-
Grand Total	143	-	276	-	405	-

Table 7. Number of children who only consumed the dietary pattern K

Item Age group(Mo.)	No. of Subjects	No. of children consumed Diet K	Total(%)
8 - 12	9	5	56
12 - 24	22	12	55
24 - 36	54	30	56

A. Nutrient Intake for 8-12 months old group

Average daily energy and 9 nutrients intake level of the rural weaning children is shown in Table 8.

Since about half of the 8-12 month olds were only breastfed and the rest of the subjects received supplementary food along with unmeasured amount of the breastmilk, total energy and nutient intake of this group has been calculated with the approximated amount of breastmilk included. It was assumed that 600 mil. of breastmilk is produced by mothers of 6-12 months old baby. When compared with ROA, caloric intake and all 9 nutrients were below the recommended level as shown in Figure 1.

The intake of calcium, iron, vitamin A, rifoflavin and vitamin C were particularly low that it meets only 11% - 17% of RDA, when the supplementary food intake was only considered.

With the breast milk, the nutrient intake level improves considerably. Iron intake alone was strikingly low that reached to only 18% level of RDA.

Table 8. Average Daily Energy and Nutrient Intake Per Weaning Children

Age Group(Mo.) \ Nutrient / Item		Energy (Kcal)	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	Vit.A (I.U.)	Vit.B_1 (mg)	Vit.B_2 (mg)	Niacin (mg)	Vit.C (mg)
* *	Breust Milk	450	6.6	27.0	204	0.3	1,140	0.1	0.22	0.88	26.0
8-12	Intake	353	10.0	3.8	56	1.8	243	0.17	0.08	3.2	5.5
	R D A	1,000	22.0	(13)	500	15.0	1,400	0.5	0.6	8.0	35.0
12-34	Intake	676	21.0	9.8	144	3.9	492	0.42	0.29	7.4	11.9
24-36		865	24.0	8.1	145	4.3	290	0.62	0.23	9.9	23.3
	R D A	1,100	35.0	(15)	500	15.0	1,500	0.6	0.7	8.0	40.0

** Cited from Fomon's Infant Nutrition (3)

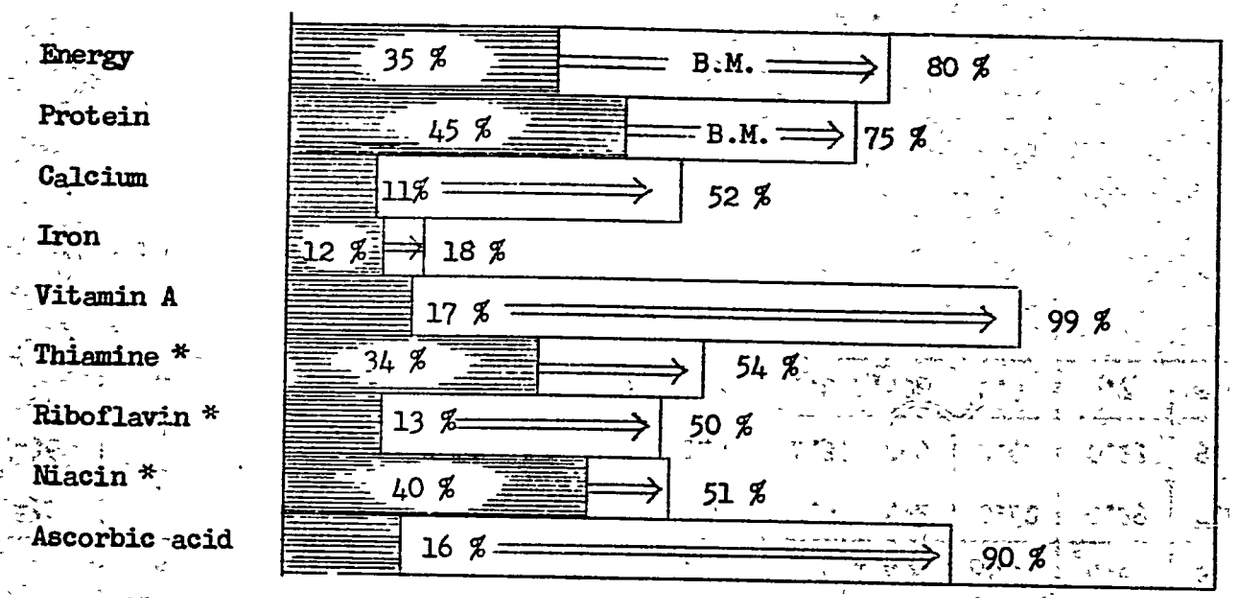


Fig.1 Average Daily Intake of Nutrients as Percent of RDA for 8-12 Months Old Rural Children

* Contribution by Breast Milk is expressed as B.M.

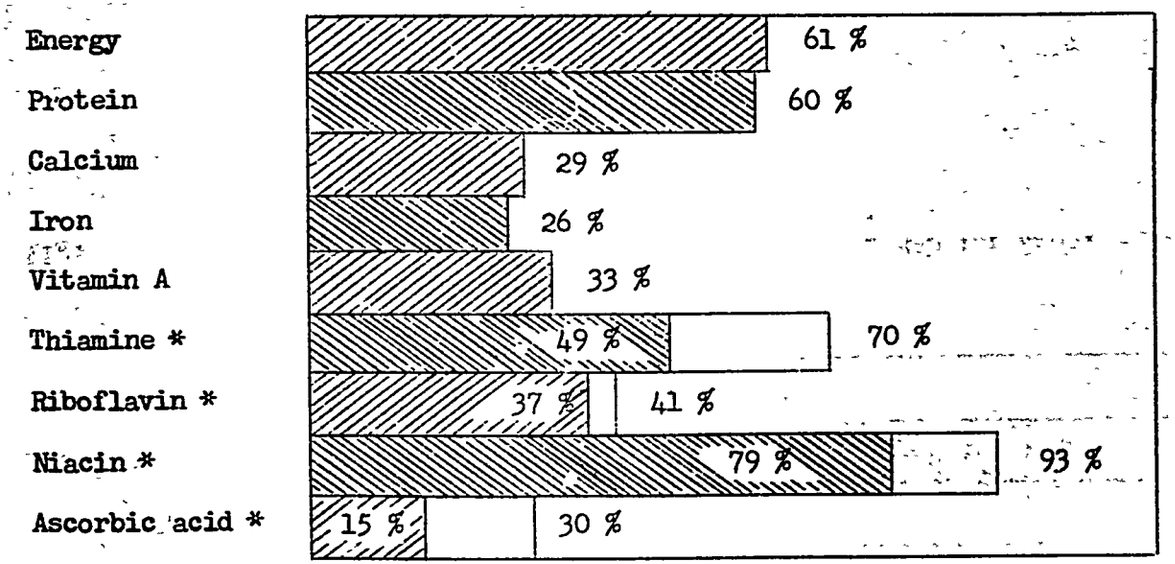


Fig. 2 Average Daily Nutritive Intake as Percentage of RDA for 12Mo.-24Mo. Age Group

* Dark portion is after deduction of cooking loss.

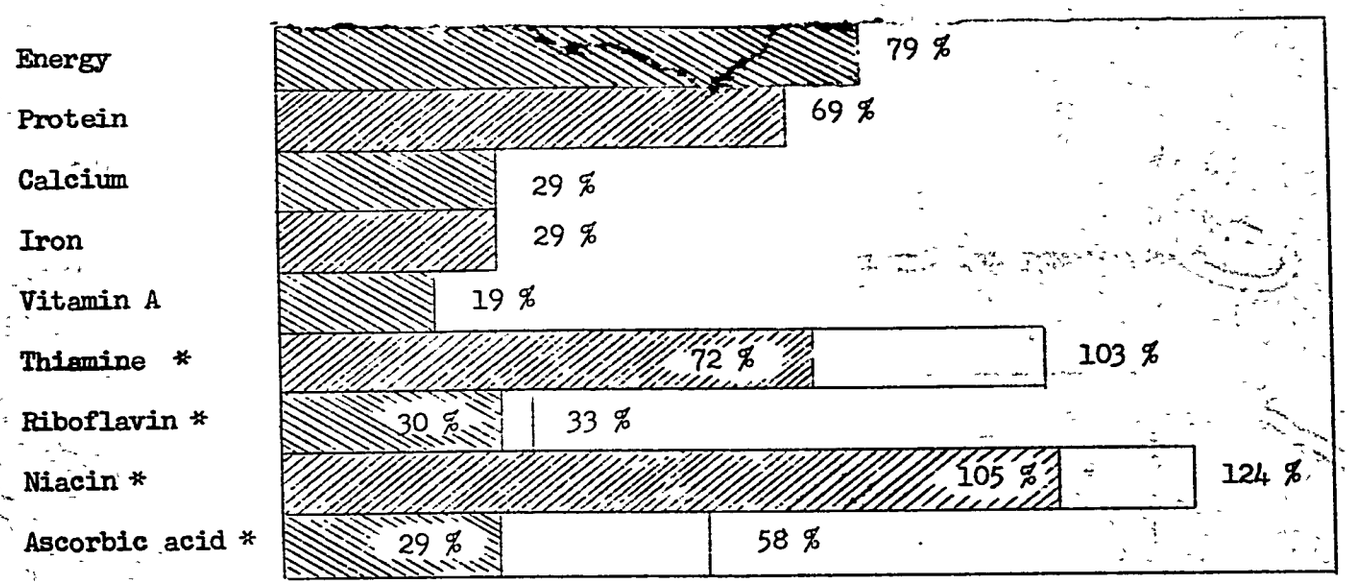


Fig. 3 Average Daily Nutritive Intake as Percentage of RAD for 24Mo. - 36Mo. Age Group

* Dark portion is after deduction of cooking loss.

The iron content of mothers' milk is very low amounting to only 33mg/100ml. (3)

Children's appetite varies but the survey carried out for two days, therefore the result may not present the real average intake level of nutrients. However the result compares reasonably well with studies done by others in various aspect.

B. Nutrient Intake for 12-36 month old group.

About 20% of the 12-24 month group and 10% of 24-36 month old group were from time to time on breast.

However all these children were receiving supplementary foods regularly.

The result does not include the milk received. Therefore, the actual intake of colorie and other nutrients will be slightly higher than presented.

The average caloric intakes for 12-24 months and 24-36 months group were 676 and 865 Calories respectively. The caloric intake of 24-36 months group met 79% RDA but the 12-24 months group had slightly lower intake reaching only 61% of recommented level. The difference was largely due to the lower consumption of cereals by the later group. Table 10 shows only 13% of the 12-36 months old children met recommended level while 58% and 29% of the children reached abc re two third or below two third level respectively.

Over 75% of the calories in the weaning childrens' diet are derived from carbohydiotes, 12% from fat and 13% from protein. The fats in the diet and mostly unsaturated.

The caloric deficit of the weaning children is reflected in the growth rates of children. Initially children grow at same rate as WHO standard for pacific region children, begin to drop below the level of the standard after the first few months of age when weaning usually begins and remain so throughout their growing period (14, 5). This caloric deficit is suggestive of caloric undernutrition for these weaning children, although such factors as amount of physical activity and inadequate protein intakes in relation to caloric intake should not be overlooked.

Protein Nutrition of Weaning Children

The average protein intake for 12-24 months group was 21g while that of 24-36 months group was 24 g which fell 60% and 69% RDA respectively.

Only 7% of these children reached RDA level while 49% fell below 3/2 level. For good utilization of protein by body, it is recommendable that one third of the total protein intake come from animal origin. This is indicative that the protein nutrition of weaning children is not satisfactory both in quantity and quality.

Mineral Nutrition

The average calcium intake as presented in Table 9 and 10 was 144 mg per day and this amounts to only 29% of RDA only 1% of all children met the RDA and 69% of fall below $\frac{1}{3}$ level which suggest that calcium intake is margiral.

Park (15) also reported a similar finling that calcium intake of preschool children of rural Korea being only about 29% of RDA. The calcium in take by rural adult was found to be 487 mg per day according to the national nutribution survey (MHSA 1975)

The children's diet are normally much simpler than adult's. The amount of the intake comes about a quarter or one fifth of the adult intake.

Since the rural children were not taking cow's milk after they were completely off the breast it is actually difficult for them to meet 500 mg recommended level from the diet K. The average daily intake of iorn for 12-24 months group and 24-36 months group were 3.9mg and 4.3 mg respectively. Table 10 shows the iron intake for these weaning children is not sufficient.

Table 9. Percentage Contribution of Food Groups to Energy & Nutrient Intake

Nutrient / Age in Mo. / Food Group	Energy			Protein			Fat			Calcium			Iron			Vitamin A			Thiamine			Riboflavin			Niacin			Vitamin C		
	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36	8-12	12-24	24-36
Cereals	85	77	80	74	58	73	47	35	52	52	29	46	51	42	61	0	0	0	82	71	78	53	24	48	62	54	60	0	0	0
Sugars	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Potatoes	1	3	8	0	1	3	0	1	2	2	3	10	1	3	9	0	2	11	0	4	13	2	3	1	0	1	3	8	25	44
Pulses	1	5	2	3	14	5	5	11	9	9	10	6	3	14	7	0	0	0	0	9	3	2	17	13	16	8	3	0	0	1
Vegetables	0	1	2	1	3	5	0	2	5	3	6	12	1	1	2	2	11	28	0	0	2	4	7	17	3	19	27	14	39	39
Fruits	3	2	2	1	0	1	3	1	1	4	1	1	3	2	5	26	4	8	6	2	2	13	3	4	3	1	1	78	18	16
Soa-weeds	0	0	0	0	1	1	0	0	0	0	4	1	0	5	2	0	22	21	0	0	0	0	4	4	0	1	0	0	2	0
Seasonings	3	2	1	7	4	2	18	6	5	14	8	5	24	11	9	0	1	1	6	2	0	13	4	4	16	1	1	0	0	0
Vegeaoblcoil	2	2	1	0	0	0	16	13	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Egg	5	2	1	13	6	3	8	12	8	11	4	2	17	7	3	72	34	30	6	2	0	13	10	9	0	0	0	0	0	0
Fishes	0	2	1	1	9	6	3	4	4	5	21	14	0	10	0	0	1	0	0	9	0	0	7	0	0	11	5	0	0	0
Milks	0	4	0	0	4	0	0	14	1	0	14	3	0	5	0	0	25	1	0	1	0	0	21	0	0	4	0	0	16	0
Meats	0	0	0	0	0	1	0	1	1	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
T.Veg.Foods	95	92	97	86	81	90	89	69	86	84	61	81	83	78	95	28	40	69	94	88	98	87	62	91	100	85	95	100	84	100
T.Ain.Foods	5	8	3	14	19	10	11	31	14	16	39	19	17	22	5	72	60	31	6	12	2	13	38	9	0	15	5	0	16	0
Grand Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 10. Percentage of Infants receiving certain Proportion of RDA for Two Age Group (12Mo. - 36Mo.)

Proportion of RDA	Energy	Brotein	Ca	Fe	V.A	V.B_1	V.B_2	Niacin	V.C
100% or more	13	7	1	0	6	34	3	59	14
66 - 100%	58	44	6	1	4	41	7	28	17
33 - 66%	28	45	24	28	11	24	35	13	24
0 - 33%	1	4	69	71	79	1	55	0	45
Total	100	100	100	100	100	100	100	100	100

Seventy one percent of the rural children were not meeting even one third of the recommended level.. It has been reported that about 40% of the rural preschool children are anemic (8) The low dietary iron intake supports the reported findings. As mentioned earlier, since the amount of total food intake is limited as well as the unbalanced dietary pattern, the resultant low intake of these two important minerals is anticipated. Iron has been the nutrient most frequently deficient in weaning diet.

Fortified weaning foods are available now but at a price too high to afford for most people.

Vitamin Nutrition

Dietary study indicated very adequate thiamine and niacin intake but suboptimal intakes of vitamin A, Riboflavin and

vitamin C among weaning children.

Over 80% of the total food intake was rice and the rice provides well niacin and thiamine but not a good source of riboflavin, vitamin A and vitamin C. It is recommendable to feed the young children rice plus bean as their major component of diet instead of rice alone. This will be simple modification to the customary diet with almost no additional economic burden yet improves the nutriture greatly.

Average daily vitamin A intake was very low that 492 I.U. and 290 I.U. were consumed by the two groups.

This survey result suggest that over 70% of the weaning children may be in an unsatisfactory vitamin A nutrition state. Biochemical and clinical studies would have provided more conclusive result along with this survey. Nevertheless the dietary intake study is suggestive and can frind correlation with many previously pubieshed findings to be dificient in Korean diet, the present study also suggest that the weaning children of rural Korea.

The vitamin C intake was reported to have the seasonal variation. Summer is usually good season for vitamin C. But this survey was condescted in winter. Winter kimchi was a major source of the vitamin. Vitamin C content of winter kimchi was reported to be decreasing as the storage time increases.

It was interesting to note that the weaning children were receiving 25%-44% of their vitamin C from Yam, a very inexpensive common rural food.

In Summary;

- All nutrients intake by the weaning children in rural Korea were deficient when compared with the recommended level.
- Particularly low were animal protein, calcium, iron, vitamin A, riboflavin, and vitamin C meeting only 10%-40% of the recommendation.

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Survey of Food and Nutrients Intake of Pregnant Women in Rural Korea

The reproductive period is one in which heavy demands are made on the mother's system to provide the nutrients needed for normal fetal development. The change of nutrient intake recommended to meet the nutritional stresses of pregnancy varies with the nutrient, depending on many factors, such as the body's mechanism for adjusting to increased demands, the nature of the metabolic changes of pregnancy, and the nutrient reserves of the mother. Pregnant women become more efficient in absorbing energy, protein, iron, calcium and other minerals and vitamins.

The knowledge of the nutrient intake level of pregnant women, one of the nutritionally vulnerable adult group, is very important but studies about them are scarce. The life time diet habits of the mother influence the outcome of pregnancy. Food habits can not be completely changed during pregnancy. The woman who has had poor food habits in the past is likely to continue them during pregnancy. However the woman during this period may be highly motivated to improve her diet since she is anxious to produce a healthy baby. National nutrition survey conducted by the Ministry of Health and Social Affairs showed that the total caloric intake of average rural residents is about the same as the urbanites but the animal consumption rate was much lower.

This indicated to us that the dietary pattern of rural residents may be more fixed and consequently the degree of nutritional imbalance is greater.

Method and Data analysis

During December 1976, 93 pregnant women in rural Korea was randomly selected from Kyong Ki Do and Choong Chung Nam Do. using the strata employed by the Ministry of Agriculture and Fisheries.
National Farm Household Economy Survey and the Production Cost Survey indicated the above mentioned two areas belong to the average rural economic level, thus the result on there two provinces may be taken to some extented to represent the average rural pregnant women.

Experienced surveyors who are familiar with the subjects and trained in advance for this study conducted the survey by the combination method of precise-weighing-and Interview for two consequetive days.

Standard tables of food composition(Korean FAO) were used to calculate the caloric and Nutrient value of foods.
Average daily total food intake per pregnant women was obtained. The calculated daily intakes of calories and a nutrients from food consumed by the pregnant women grouped according to the gestation period are compared with the recommended dietary allowances for pregnant women.

Results and Discussion

1. General characteristics of the subjects.

Table 1 shows the age composition of 93 pregnant women in rural Korea randomly selected from Kyong Ki Do and Choong Chung Nam Do. They were grouped according to the gestation period.

Table 1. General characteristics of the Subjects Investigated

Age (Year)	20-25	25-30	30-35	35-40	Over40	Total
Person (%)	33.0	36.0	24.0	6.0	1.0	100
Gestation Period(Mo)	1-3	3-6	6-9	-	-	Total
Person (%)	20.0	38.0	42.0	-	-	100
Education level	Illiterate	Literate	Primary Sch	Middle Sch	High Sch	Total
Person (%)	3.0	4.0	66.0	24.0	3.0	100
Cultivated Land (Jeong-Bo)	Under 0.5	0.5-1.0	1.0-1.5	1.5-2.0	Over2.0	Total
Household (%)	30	32	24	6	7	100

Almost 70% of them were 20 to 30 years of age.
Forty two percent of the pregnant women were in the last trimester of pregnancy, while 39 percent of the subjects were in the second trimester, the pregnant women in the second and the last trimester make up about three forths of total subjects.

Most of these pregant women had received 6 years of formal education. Hight school graduates make up only 3.3% of the total subjects while the same percentage women were illiterate. This tells us that a formal nutrition education should be included early in the elementary school curriculum.
When these pregnant women were grouped according to their cultivating land owned, the distribution was very similar to the national average of all farmers. This suggested that the selected pregnant women in this survey may be extended to represent the average pregnant women of rural Korea.
Seventy three percent of the pregnant women already had one or 2 children and 24% had 3 or 4 children prior to this pregnancy.

2. Food and Nutrient intake

Table 3 shows the amount consumed of 5 basic food groups by pregnant women in 3 different gestation period. Total amount of food consumed was sufficient in quantity but clearly unbalanced. Over 95% of the total food consumed was vegetable food. Cereals of Food group III were consumed in highest quantity while calcium providing food groupIII, small fish, milk etc., fats and oils were consumed in minimal quantity.

Table 2. Average Daily Food Intakes Per pregnant women by 5 Basic Food Groups according to Gestation Period(Unit= Gin.)

Food Group \ Month	1-3	4-6	6-9	Mean
Meats	15	2	4	7
Fishes	10	14	7	10
Egg	3	2	3	3
Pulses	35	51	49	45
Sub-total	63	69	63	65
Fruits	9	2	5	5
Vegetables	474	478	519	491
Sub-total	483	480	524	496
Cereals	688	698	745	710
Potatoes	119	29	76	75
Sub-total	807	727	821	785
Small Fishes	1	1	1	1
Sea-weeds	2	2	1	2
Sub-total	3	3	2	3
Fats and Oils	2	2	3	2
Sesame	1	1	1	1
Sub-total	3	3	4	3
Total Veg. Foods	1330	1263	1399	1331
Total Ani. Foods	29	19	15	21
Grand Total	1359	1282	1414	1352

During the first trimester in which many pregnant women experience the pregnancy related morning sickness, total food intake was not reduced.
However meats, and fruits-most infrequently consumed food items were consumed in larger quantity at first part of the gestation period than in advanced period.

Particularly noticeable was unusually high consumption of the sweet potatoes during the first trimester.

Total food intake was found not to be increased since the onset of the pregnancy and throughout. Similar observation was made by cha and park ( ).
Extremely small portion of the total food intake was derived from animal sources.

Normally 4-6% of the total foods are known to come fram animal sources in Korean diet. In this study only 1.6% of the total foods were found to be animal origin for the pregnant women's diet which may suggest that women indeed share less than the average proportion of the animal foods than other family members.

Studies conducted on the food consumption pattern among pregnant women in Seoul found very differently from this survey.

Pregnant women in Seoul, more educated with greater purchasing power were reported to be consuming constientiously increased amount of milk, meats, eggs i.e, animal foods. (3.7).

Average intake of Nutrients

Table 3 shows the daily average calorie and 9 nutrients intake level of the pregnant women. There was almost no difference in average nutrient intake for pregnant women in 3 stages of pregnancy.

This was a finding contrary to a general belief that the pregnant women in early period of pregnancy can not eat normally due to the morning sickness, abnormal taste etc and therefore their food intake would be substantially reduced.

Percent contribution of each 5 food groups to calorie and 9 nutrients is presented in Table 4.

Table3. Daily average Nutritional Intakes per Capita according to Gestation Period.

Item / Mo. Group	Energy (kcal)	Protein (g)	Fat (g)	V. A (I)	V.B1 (mg)	V.B2 (mg)	Niacin (mg)	V. C (mg)	Ca (mg)	Fe (mg)
1-3	2,682	77.5	22.0	1,113	1.88	0.99	38.3	95.6	501	14.4
3-6	2,498	77.2	21.1	1,201	1.63	0.77	38.0	75.3	496	14.4
6-9	2,739	77.6	23.1	1,322	1.90	0.86	41.4	94.4	482	15.1
Mean	2,635	77.5	22.1	1,235	1.78	0.85	39.5	87.2	491	14.7
RDA	2,300	95.0	(30.7)	2,400	1.30	1.50	15.0	65.0	1,200	18.0

Table 4. Percentage of average Nutritional Intakes by 5 Basic Food Groups

Item / Food Groups	Energy	Protein	Fat	V.A	V.B1	V.B2	Niacin	V.C	Ca	Fe
Meats	0.3	1.3	0.9	0.1	1.7	0	0.8	0	0	0.7
Fishes	0.4	2.2	1.8	0	0	1.2	1.5	0	4.9	1.4
Egg	0.2	0.4	1.3	3.3	0	1.2	0	0	0.3	0.7
Pulses	2.7	8.7	12.7	0	4.5	9.4	4.8	0	11.7	17.7
Sub-total	3.6	12.6	16.7	3.4	6.2	11.8	7.1	0	16.9	21.5
Fruits	0.2	0.1	0	0.7	0	0	0	0.7	0.1	0
Vegetabls	4.6	13.4	14.5	87.6	10.7	36.5	40	84.5	28.2	6.1
Sub-total	4.8	13.5	14.5	88.3	10.7	36.5	40	85.2	28.3	6.1
Cereals	87.0	71.5	57.5	0	77.5	44.7	51	0	45.5	66.7
Potatoes	3.4	0.9	0.9	3.2	5.1	4.7	1.0	14.6	3.8	3.4
Sub-total	90.4	72.4	58.4	3.2	82.6	49.4	52.0	14.6	49.3	70.1
Small Fishes	0.1	0.9	0.4	0	0	1.2	0.3	0	2.3	0.7
Sea-weeds	0.1	0.3	0	5.1	0	1.1	0.3	0.2	2.0	1.4
Sub-total	0.2	1.2	0.4	5.1	0	2.3	0.6	0.2	4.3	2.1
Fats and Oils	0.8	0	7.7	0	0	0	0	0	0	0
Sesame	0.2	0.3	2.3	0	0.5	0	0.3	0	1.2	1.2
Sub-total	1.0	0.3	10.0	0	0.5	0	0.3	0	1.2	1.2
Total Veg. Foods	99	95	95	97	98	98	98	100	92	97
Total Ani. Foods	1	5	5	3	2	2	2	0	8	3
Grand Total	100	100	100	100	100	100	100	100	100	100

Since rice-kimch make up over 90% of the total food intake, high contribution from these two food items to most nutrients is expected. Cereal alone - mostly rice with a small portion of barley and wheat provided over or near half of the nutrients supply for all but vitamin A and C.

Kimchi with small amount of other vegetables supplied 88% of total vitamin A intake and 85% of total vitamin C intake.

The comparison of this average nutrient intake level with the recommended dietary allowances for pregnant women in Korea in shown in Figure 1.

The intakes of total energy, thiamine, niacin and vitamin C exceeded the recommended allowances whereas the intakes of protein, vitamin A, riboflavin, calcium and iron were below the recommended requirement level. The intakes of vitamin A, calcium and riboflavin were particularly low that they barely met only about half or less of the requirements.

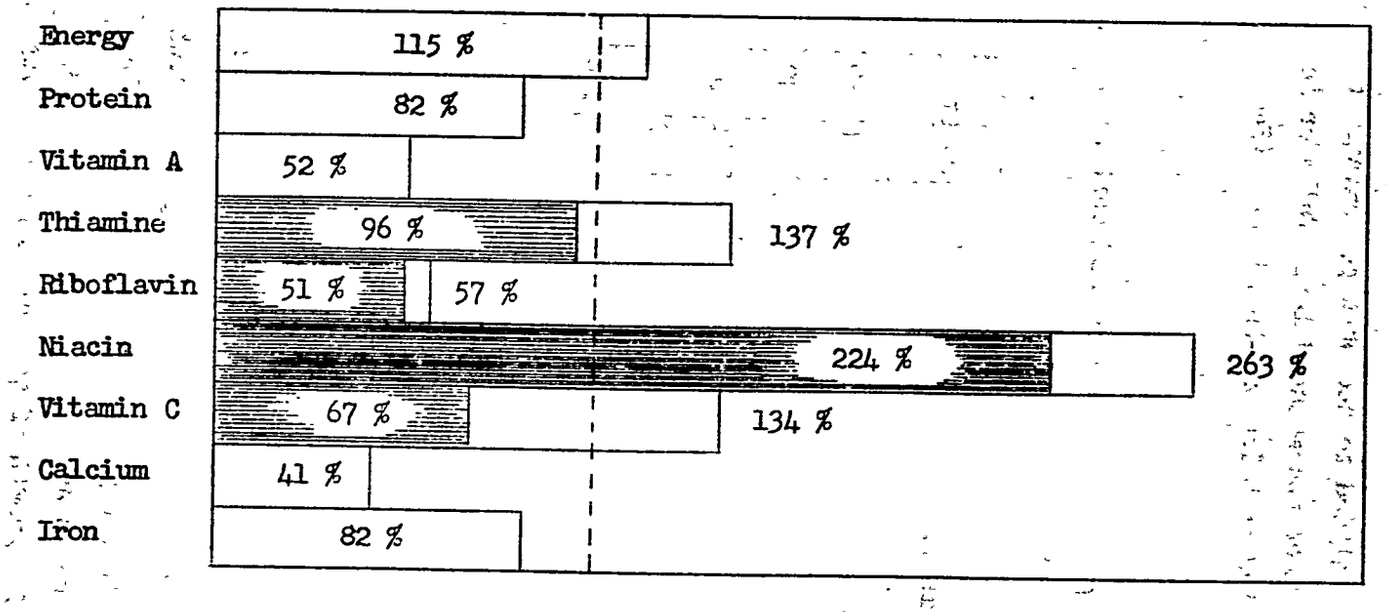

Fig.1 Percentage of RDA provided by the average daily intake of nutrients from foods consumed by pregnant women.

* Dark portion indicates values after deduction of cooking loss:
B1 30%, B2 10%, Niacin 15%, V.C 50%

This has been further analyzed to see what percentage of the pregnant women actually meet recommended level fully or in excess of, two-third, one-third or below one-third level (See Table 5)

Table 5. Percentage of pregnant women consumed certain Proportion of RDA

Item / RDA	Energy	Protein	V.A	V.B1	V.B2	Niacin	V.C	Ca	Fe
100% or more	71	29	11	83	5	100	67	1	30
66 - 100 %	25	48	16	16	33	0	17	6	39
33 - 66%	4	23	44	1	58	0	16	61	30
Under 33%	0	0	29	0	3	0	0	32	1
Total	100	100	100	100	100	100	100	100	100

Thirty two percent of the pregnant women consumed calcium in level less than one third of requirement. About one third of the total subjects consumed vitamin A less than one-third of the requirement.

A brief discussion on these deficient nutrients follows:

A) Protein : Average total protein intake was 77 g of which 95% came from vegetable foods. The total protein intake is about 80% of the recommended level. The growth of the infant makes heavey

demands for protein of high biological value. Protein restriction during fetal life is associated with a decrease in the number of cells in tissues at the time of birth. This is particularly serious in the case of the brain, which is relatively well developed in prenatal life and may be irreversibly stunted.

Some studies showed that protein intake of the mother influences the birth length of the fetus within the limits determined by heredity, taller babies being born to mothers with high protein diets than to those with limited protein intake.

Although it is difficult to say that 77 g protein is "restricted level" of protein but the protein intake may be improved in quantity and more with quality for optimal growth and fetal development.

B) Iron: Average intake of iron was 15mg a day meeting about 80 % of RDA. Seventy percent of this iron was obtained from cereals and 20% from meats, eggs and pulses. Iron from cereals is known to be poorly absorbed and that from muscle is readily available. Since infants are born with high hemoglobin levels of 18 to 22 gm per 100 ml. of blood and with a supply of iron stored in the liver to last from 3 to 6 months, the mother has to transfer about 300 mg. iron to the fetus during gestation.

If woman goes into the pregnancy with like or no iron reserves, as appears to be the case in many Korean rural women, maternal hemoglobin levels will drop. Office of Rural Development reported in its Applied Nutrition Project evaluation studies that the mean hemoglobin level of the average pregnant women is lower than the non-pregnant women in rural Korea.

C) Calcium: Although the infant's bones are poorly calcified at the time of birth, a demand still exists for an appreciable amount of calcium for fetal development. The demand of approximately 7 mg. a day for the first trimester increases to 110 mg. per day in the second trimester and jumps to 350 mg. in the last trimester. The calcium intake of the rural pregnant women was 491 mg. a day 92% of which was obtained from vegetable foods. The mean calcium intake level meets only about 40% of the recommended requirement. As table 3 shows, calcium providing food group III was consumed an average of 3 gm only.

D) Vitamin A : The intake of Vitamin A was only half of the recommended requirement. Eighty eight percent of this was obtained from vegetables and fruits. Since the Utilization of b - carotene is poor in low fat intake, it is also recommendable to increase fat consumption level. Eighty eight percent of 1235 Uitamin A International Unit consumed by the pregnant

women came from vegetables - largely as Kimchi. Seasonal variations in vitamin A consumption should be considered.

Park ( ) reported that there is about 47% difference between Spring and Autumn. Spring was found to be the season that farmers had highest amount of vitamin A intake and autumn the lowest. Winter in which this survey was conducted fell about in the middle of the range.

This study may be summarized as follows:

1) The dietary pattern of the Korean pregnant women in rural areas is imbalanced.
2) It was obvious that the dietary patterns of pregnant women changed very little since the onset of the pregnancy.
3) A deficiency in several nutrients is inevitable with such a imbalanced diet.
4) The intakes of total energy, thiamine, niacin and vitamin C exceeded the recommended allowances where as the intakes of protein, Vitamin A, riboflavin, Calcium and iron were below the recommended level.
5) Cereals and potatoes provided 90% of total caloric intake for the pregnant women.

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Nutrient Intake Survey of Lactating Women in Rural Korea

Almost all Korean rural women are breastfeeding their children for an average 18 to 24 months.

Although there are some traditions and prejudices among different cultures, a good diet for lactating mothers are stressed perhaps in all human societies.

It is commonly believed that the milk production and composition are independent of the mother's diet, except for the water soluble vitamins. However, the content of vitamin B complex, calcium, fat and vitamin C are known to be easily influenced by the mother's diet while vitamin A, and protein content does not change so markedly.

Since the baby's growth performance correlates with the quantity and the quality of breastmilk, it is important to stress the importance of a good diet for the lactating mothers to prevent progressive depletion of mothers tissues and to achieve optimum contents of nutrients in the milk.

Since the rural women breastfeed their children for so long mother's will need to be refurnished to make up the loss.

There has been almost no studies conducted on the nutrient intake level of lactating women in rural Korea.
This study was conducted to obtain the nuctrient intake level

of these nursing mothers in rural Korea so that it may serve as a baseline information in setting up mother-child care policy for rural community.

Method

We have randomly selected 93 lactating women from Kyong Ki Do and Choong Chung Nam Do. These two provinces were selected because they are known to be the national average in farm household income and located in convenient distance from Seoul. Within the provinces, purposive sampling method and random sampling methods were suspended.

Thirty one experienced enumerators who are permanently stationed at the sampling locality conducted this survey. Although the surveyors had many years of survey experience and were acquainted with the subjects, they were specifically trained for this particular survey in advance. They were acquainted with the combination of precise weighing and interview method.

Each survey agent visited 3 farm houses with women who have been breastfeeding their children for one to 12 months. The agent visited the farm houses 3 times a day before and after each meal for two days. The agent weighed the edible portion of raw materials just before cooking on a kitchen scale and measured the amount of the dish after cooking. The agent then recorded the portions of each dish each household member of the family had eaten at each meal with the lactating women

in mind. Afterwords, the actual amount of food consumed by the lactating women is converted into the weight of raw materials.

Intakes of calories, protein, calcium, iron, vitamin A, thiamine, riboflavin and vitamin C were then analyzed. Standard tables of food composition (Korean FAO) were used in the calculations.

The amount of the β-carotene consumed was divided by 3, the physiological utilization factor, in order to obtain the average intake of vitamin A. The average daily intake for each lactating women for each of the eight nutrients was compared with the recommended dietary allowances for Korean lactators.

Results and Discussion

1. General characteristics of the lactating women in rural Korea.

2. Food and Nutrient Intake of the lactating women

   (A) Quantity and kind of foods consumed

   (B) Caloric Intake

   (C) Protein and Fat Nutrition

   (D) Vitamin Intake

   (E) Calcium and Iron Intake

1. General characteristics of the subjects

Ninety three lactating women randomly selected were all from Kyong Ki Do and Choong Chung Nam Do. We may assume that they represent the lactating women of whole rural Korea. As Table 1 shows their economic and educational level are within the national average value for rural Korea.

Table 1. Age and Sex Distribution of 93 Rural Infants and Toddlers

Sex \ Age Group (Mo.)	8-12	12-24	24-36	Total
Male	11	10	24	35
Female	5	13	30	48
Total	16	23	54	93

Sixty four percent of the lactating women were in their 20's, 31% in their 30's and only 5% of the lactating women were in their 40's.

Seventy percent of the lactating women had received 6 years of public school education while 18% had 9 years and only 8 percent graduated from high school suggesting any nutrition education should be provided in elementary school.
Currently nutrition is mentioned briefly in home economics class of junior high school.

This means that most rural women did not have an opportunity to learn about nutrition at school. Forty percent of the lactating women already had 3 or more children while 60% had one or two children.

2. Food and Nutrient Intake

(A) Quantity and kind of foods consumed

Table 3 shows the various kinds of foods consumed by the lactating women along with the amount of each food groups consumed. The contribution of various food groups to each of 10 nutrients is also presented in Table 2.

Table 2. Percentage in Size of Cultivated Land in Sample Household

Unit = %

Size / Age Group(Mo.)	Under0.5 (JeongBo)	0.5-1.0 (JeongBo)	1.0-1.5 (JeongBo)	1.5-2.0 (JeongBo)	over2.0 (JeongBo)	Total
8-12	5.4	9.8	2.2	0	0	17.4
12-24	5.4	7.6	6.5	1.1	3.3	23.9
24-36	7.6	23.9	20.7	5.4	1.1	58.7
Total	18.4	41.3	29.4	6.5	4.4	100

* 1 Jeong-Bo=2.45 acre

Table 3. Age Distribution of Parents

(Unit = %)

Parents / Age (Yr.)	Mother	Father
20-25	19.6	4.6
25-30	44.6	26.4
30.35	17.4	36.8
35-40	11.9	17.3
over 40	6.5	14.9
Total	100	100

The comparison of the average nutrient intake with recommended dietary allowances for lactating women in Korea is shown in Table 2.

Average lactating women are consuming greater amount of total food than average farmers. An average Korean rural resident is known to be consuming about 1106 grams per day. Here an average lactating women in rural Korea is consuming 1519 grams a day.

Only 1.6% of the total food intake was animal food which is considerably lower than national average (5.9% in MHSA report).

Over 55% of this total food intake was cereal mainly rice. kimchi and other vegetables made up about 37% of total food intake.

Beam paste, soysauce and other bean products accounted for 4% of total food intake. Some sweet potate, meats and fishes, fruits, seaweeds, dried small fish and sesame oil were consumed but in minimal quantity. No milk or milk products were consumed by the lactating women during the survey period.
These clearly demonstrate that the lactating women in rural Korea are consuming rice-kimchi diet in large quantity.

(B) Caloric Intake

Caloric intake was found to be sufficient for the lactating women in rural Korea. An average daily total caloric intake was 2971 Kcal which comes to 119% of RDA.

Although 80% of the total caloric intake comes from carbohydrates, it is good that the lactating women are supplied adequately in calorie. Adaptation and maximum utilization of nutrients that are known to take place during physiological stresses such as pregnancy, lactation, healing etc, can optimally operate when calorie is not a limiting factor.
Table 4 shows that 77% of the subjects were consuming 100% or over recommended level for calorie.

Table 4. Education Level of Parents

(Unit = %)

Parents / Education	Mother	Father
Il-literate	3.3	1.1
Literate	1.1	3.3
Primary School	70.3	44.6
Middle School	20.9	22.8
High School	4.4	22.8
College	0	5.4
Total	100	100

(C) Protein and Fat Intake

Mean intake of protein by the lactating women was 88 grams - 88% of RDA of which only 5% was provided by animal foods. One third of the total protein intake coming from an animal source is generally regarded to produce optimally utilizable amino acid pattern.

One can easily suspect from the rice-kimchi pattern that 72% of the total protein was contributed by rice and same barley. Beans and bean products contributed 11%. Twenty six percent of the subjects had consumed the protein 100% or over the RDA level and 63% of the lactating women had consumed over two third RDA level.

Normally Korean diet is characterized by the high carbohydrate and low fat diet. An average lactating women in rural Korea was consuming only 26 grams of fat a day. Of this 94% was vegetable oil - mostly sesame seed oil which is highly unsaturated.

(D) Vitamin Intake

Since the rice and kimchi make up over 90% of the total food intake for the lactating women, nutrients derived from these two foods will constitute as major contributing sources for many nutrients. Mean daily intakes of niacin, thiamine and ascorbic acid exceeded the recommended allowances. But average vitamin A intake was very low.

An average daily vitamin A intake for lactating woman in rural Korea was 1171 International Unit which comes about 33% RDA. The recommended level of vitamin A for lactating woman is 75% higher than normal adult. Vegetables supplied 92% of the vitamin A for the subjects.

Obviously the lactating women were not driving conscientious effort to include any extra good quality foods in their ordinary diet, they were repeatedly consuming the same dietary pattern that is rice-kimchi diet. They were not consuming any more carrots, fish, beans etc. than non-lactators. These however, can be obtained in reasonably inexpensive price in rural community.

Mean riboflavin intake of the lactating women was 0.92 mg. which is about 54% of the recommended allowance. Only 3% of the subjects exceeded the riboflavin consumption to the allowance level. Majority of the lactating women were consuming the riboflavin in the range of 33% to 66% RDA level.

(E) Calcium and Iron Intake

Mean daily intake of calcium by the lactating women was 490 mg. This is 41% of the RDA. Most of the calcium was supplied by rice, kimchi and a small amount from bean products. Seaweeds and small dried fish contributed about 5% of the total calcium intake.

As table 4 shows, not a single lactating women consumed the calcium to recommended level, 16% of the subjects were consuming less than one third the allowance. milk and milk products are excellent sources of calcium, but unlike to the urbanites dairy products are not yet penetrating into the rural life.

The marginal levels of calcium and vitamins could best be improved by increasing the intake of small dried fishes, beans and green-leafy vegetables.

An average lactating woman excretes about 500 - 1000 milligrams of calcium daily. Most of the women nurse their babies for long period (one to three years) thus the need to refurnish becomes obvious.

Unlike the weaning children, the lactating women in rural Korea were generally consuming adequate amount of iron. Half the subjects were consuming iron full or exceeding level of RDA and the remaining half were in $\frac{2}{3}$ RDA level.

Summary

The results of food and nutrient intake study of 93 lactating women in rural Korea may be briefly summarized as follows:

1) Dietary pattern of the lactating women was not different from ordinary Korean diet - i.e. no conscientious effort to include various food groups was found.

2) Over 90% of total food intake was made up with rice-kimchi.

3) No milk and milk products were consumed by the lactating women in rural Korea.

4) The quantity of the total food intake was greater than national average - thus sufficient intake of calorie was observed.

5) The average amount of protein intake was not sufficiently satisfactory level but will need to improve more the quality of the protein.

6) Mean daily intakes of niacin, thiamin and ascorbic acid exceeded the recommended allowances but vitamin A, riboflavin intake was below the recommended level.

7) Average calcium intake was 490 gm - 41% of RDA but iron intake was adequate.

Survey on Food Consumption and Nutrient Intake of Rural Population in Korea

Introduction

As Korea undergoes rapid economic development in recent years, average monthly family income in cities and farm has been substantially increased (15).

From 1962 to 1976 gross national product grew at an average rate of 10.1 percent. Output from non-agricultural sectors grew during the period at an average annual rate of 13 percent. The agricultural sector grew at a modest rate of 4.8% per year.

The agricultural sectors contribution to GNP declined from 44% in 1961 to 22.5% in 1974 (16).

The rather wide differential growth rate existed between the agricultural and non-agricultural sectors contributed to a growing Socio-economic disparity between the sectors.

This also seems to appear in changes of food consumption pattern among urbanites and rural residents.

Urbanites tend to rely more on non-traditional food stuffs such as dairy products, processed foods and increased consumption of animal foods while rural resident's food consumption pattern remain relatively static (7).

Quite a few food consumption and Nutrition Surveys have been carried out in Korea since 1950's. A brief overview on these studies is included in this report under separate section.

Almost all of these studies obtained average daily nutrient intake of population under study from the measurement of 3 to 7 days food intake.

A record of 3 or 7 days food intake will probably not be representative of the intake for the whole year.

Since food consumption subsequently the nutrient intake is affected by the food availability, studies that encompass a few days of intake will probably be subjected to the seasonal variations.

It was found to be particularly true here in Korea for nutrients such as vitamin A and ascorbic acid.

Some have attempted to minimize this seasonal variation in obtaining the average daily intake of nutrients that can represent the whole year by conducting nutrient intake study for 3 or 7 days from each 4 seasons and taking the mean (14).

The Ministry of Health and Social Affairs has been conducting National Nutrition Survey Since 1969.

They designed the whole country to be divided into several areas and covered selected few areas each year so as to cover the whole country in 3 years.

The ministry redesigned it recently to cover the whole country each year.

Food Balance sheet annually published jointly by Ministry of Agriculture and Fisheries with Korean FAO is also a valuable source for estimation of food consumption and nutrient intake level of Koreans.

The Ministry of Agriculture and Fisheries has been conducting farm household Economy survey for over decade now. Among its dynamic survey items farm household living expenses which is divided into three parts-living, food, and miscellaneous has been included.

This study examines the possibility of obtaining the average food consumption and nutrient intake level of rural residents using this primary data.

There are several factors considered in initating this study.

1) The primary data are collected extensively under the Government auspice and the valuable information regarding the nutrient intake level by rural residents may be obtained without additional economic burden to Government.

2) The sample size will be the biggest yet studied and covers the whole sectors of rural community.

3) The information derived from the year around observation will more likely represent true average daily food consumption level.

4) The data may be interpreted with other factors which are closely interrelated and affecting the food consumption level may be easily obtained for the family through utilization of other survey items.

Description on primary data

The survey results are obtained by analyzing the results of the Farm Economic Survey, M.A.F. Therefore, the enumeration methods and process are the same as those of the Farm Economic Survey.

Food expenditure data collected on February, April, June, August, October and December 1976 were analyzed and the mean values are presented in this report.

Mean values are then compared with the recommended dietary allowances for Koreans.

Adult rates for each nutrients were tabulated and expressed the mean value in terms of "per adult". Consumption made as B-carotene was converted to vitamin A by multiplying the amount of -carotene consumed by 1/3 and compared with recommended level of vitamin A (200 I.U.).

Results and Discussion

I. Analysis of 6 months food expenditure data

A. General Description of subjects. Table 1-a shows the distribution of 2515 farm households according to the

size of farm defined in terms of holdings of cultivated land.

S_1 ..... farmers who can less than 0.5 hectare

S_2 ..... " 0.5 - 1.0 hectare

S_3 ..... " 1.0 - 1.5

S_4 ..... " 1.5 - 2.0

S_5 ..... Over 2.0

Quarter of these farm households occupy on area of less than 0.5 hectares while over third are in the size range of farm 0.5 to 1.0 hectares.

The land distribution in small holdings is one of the main limiting factors affecting the increase of Agricultural production, (12) consequently affecting food consumption and nutrient intake level. The size of an average household increases as the land holding size increase.

Nean family size was 5.7 persons per farm household (See Table 1-b).

Almost half of the subjects in all economic sectors (S_1 through S_5) had received 6 years of formal education. More people who ouns large farm had received higher education than the marginal or small farm families.

Table 1. General Characteristics of Subjects

(T-a) Household Distribution by Cultiviated Land

(N=2515)

Class	Under 0.5 J.B. S_1	0.5-1.0 J.B. S_2	1.0-1.5 J.B. S_3	1.5-2.0 J.B. S_4	Over 2.0 J.B S_5	Total
Percentage	25	38	21	9	7	100

(T-b) Number of Family perhousehold by cultivated Land

Class	S_1	S_2	S_3	S_4	S_5	Mean
Number	4.8	5.5	6.2	6.6	6.8	5.7

(T-c) Education Level Distribution by Cultivated Land

Item \ Class	S_1	S_2	S_3	S_4	S_5	Mean
Children	17	16	15	16	13	16
Illiterate	11	10	10	8	7	10
Literate	10	11	11	10	12	11
Primary Sch.	47	47	44	43	41	45
Middle Sch.	11	12	14	15	16	13
High School	4	4	5	7	9	5
College	0	0	0	1	2	0
Total	100	100	100	100	100	100

(T-d) Average Age Distribution

Age Group(Yr)	Under 14	15-19	20-49	50-59	Over 60	Total
Percentage	40	11	31	9	9	100

B. Food Consumption

Table 2 shows an average amount of various foods consumed per person per day.

The total amount of food consumed compares closely with the result obtained by Food Balance Sheet but Slightly lower than MHSA national nutrition survey result.

No meats or eggs were consumed by rural population. Only 2% of total food intake was animal origin, lower than national average of 4-6%. This result clearly identifies again that any change in food consumption pattern that are claimed to be occuring in Korea is really limited to the big cities. Food consumption pattern, traditionally high carbohydrate-vegetable diet is the same for rural population.

C. Nutrient Intake.

The daily average Calorie and 9 nutrients intake level per person obtained from 6 months food expenditure data is presented in Table 4. Table 3. presents the adult rate applicable to each nutrients for subjects grouped by land holding size. The average daily nutrient intake "per adult" was then calculated using the adult rate and presented in Table 5.

The comparison of the average nutrient intake level with the recommended dietary allowances for Koreans is shown in Figure 1.

Table 2. Average Daily Consumption of Various Food Groups

Item / Food Group	Amount (g)	Percentage (%)	MHSA (g)	Food B. Sheet
Cereals	521	58.0	509	529
Pulses	9	1.0	29	23
Potatoes	116	13.0	61	98
Vegetables	145	16.0	279	171
Fruits	11	1.0	12	39
Sea-weeds	1	0	5	14
Seasonings	27	3.0	38	17*
Others	52	6.0	-	-
Meats	0	0	5	11
Fishes	20	2.0	39	16
Eggs	1	0	1	11
Milks	0	0	0	6
Fats & Oils	3	0	1	7
T. Veg. Foods	884	98.0	933	898
T. Ani. Foods	21	2.0	45	44
Grand Total	905	100	978	942

* Sugar 14g and seame 3g.

Figure 2 through 7 present the percent contribution of various food groups to calorie and 9 nutrients.

Cereals contributed over half of the all nutrients except vitamin A and ascorbic acid. Vegetables supplied these two nutrients in largest proportion.

Table 3. Adult Rate Applicable to Each Nutrients for Subjects grouped by Land holding Size.

Item / Class	Energy	Protein	V.A	V.B_1	V.B_2	Niacin	V.C	Ca	Fe
S_1	0.79	0.85	0.99	0.79	0.80	0.79	0.85	1.19	1.31
S_2	0.79	0.85	1.00	0.79	0.81	0.80	0.85	1.19	1.32
S_3	0.80	0.85	1.00	0.80	0.81	0.80	0.86	1.19	1.32
S_4	0.80	0.85	1.00	0.80	0.81	0.80	0.86	1.18	1.31
S_5	0.81	0.87	1.00	0.81	0.82	0.81	0.87	1.19	1.31
Mean	0.80	0.85	1.00	0.80	0.81	0.80	0.86	1.19	1.31

Table 4. Average Daily Nutritional Intake Per Person

Item	Energy (Kcal)	Protein (g)	Fat (g)	V.A (IU)	V.B_1 (mg)	V.B_2 (mg)	Niacin (mg)	V.C (mg)	Ca (mg)	Fe (mg)
Intake	1,970	59.4	18.4	849	1.59	0.69	24.1	56.3	338	12.9
RDA	2,160	68.0	-	2,000	1.12	1.30	14.4	51.6	595	13.1

RDA was modified by adult rate for each Nutrient.

Table 5. Average Daily Nutritional Intakes Per Adult According to the Cultivating Land Size

Item / Class	Energy (Kcal)	Protein (g)	Ani. Prot. (g)	Fat (g)	V.A (IU)	V.B_1 (mg)	V.B_2 (mg)	Niacin (mg)	V.C (mg)	Ca (mg)	Fe (mg)
S_1	2,401	70.2	4.9	19.9	813	2.02	0.83	30.5	62.2	270	9.4
S_2	2,542	70.7	5.1	23.4	858	2.10	0.93	30.3	61.0	286	10.0
S_3	2,430	68.3	4.9	25.5	777	1.99	0.77	29.2	63.0	272	9.6
S_4	2,735	76.5	4.9	31.1	1,197	2.30	1.14	30.7	76.4	326	10.5
S_5	2,465	70.0	4.9	26.4	952	1.93	0.73	27.4	61.3	283	9.8
Mean	2,515	71.1	4.9	25.2	919	2.07	0.88	29.6	64.8	287	9.8

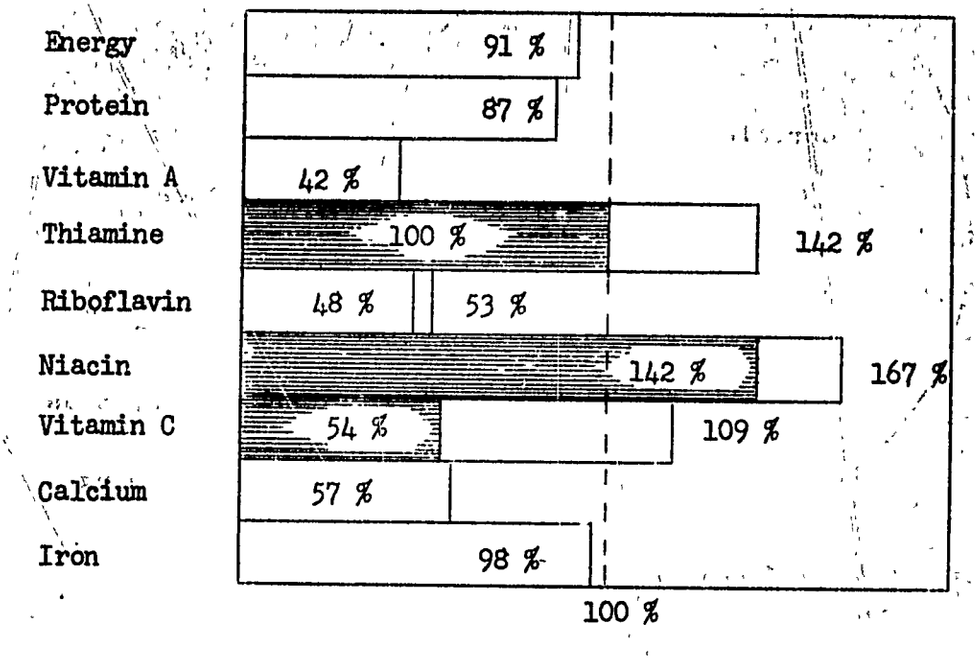

Fig. 1 Percentage of Average Nutritional Intakes Per Person Per Day to Corresponding RDA.

* Dark Portion is the value after deduction of cooking loss (B_1 - 30%, B_2 - 10%, Niacin 15%, V.C. 50%)

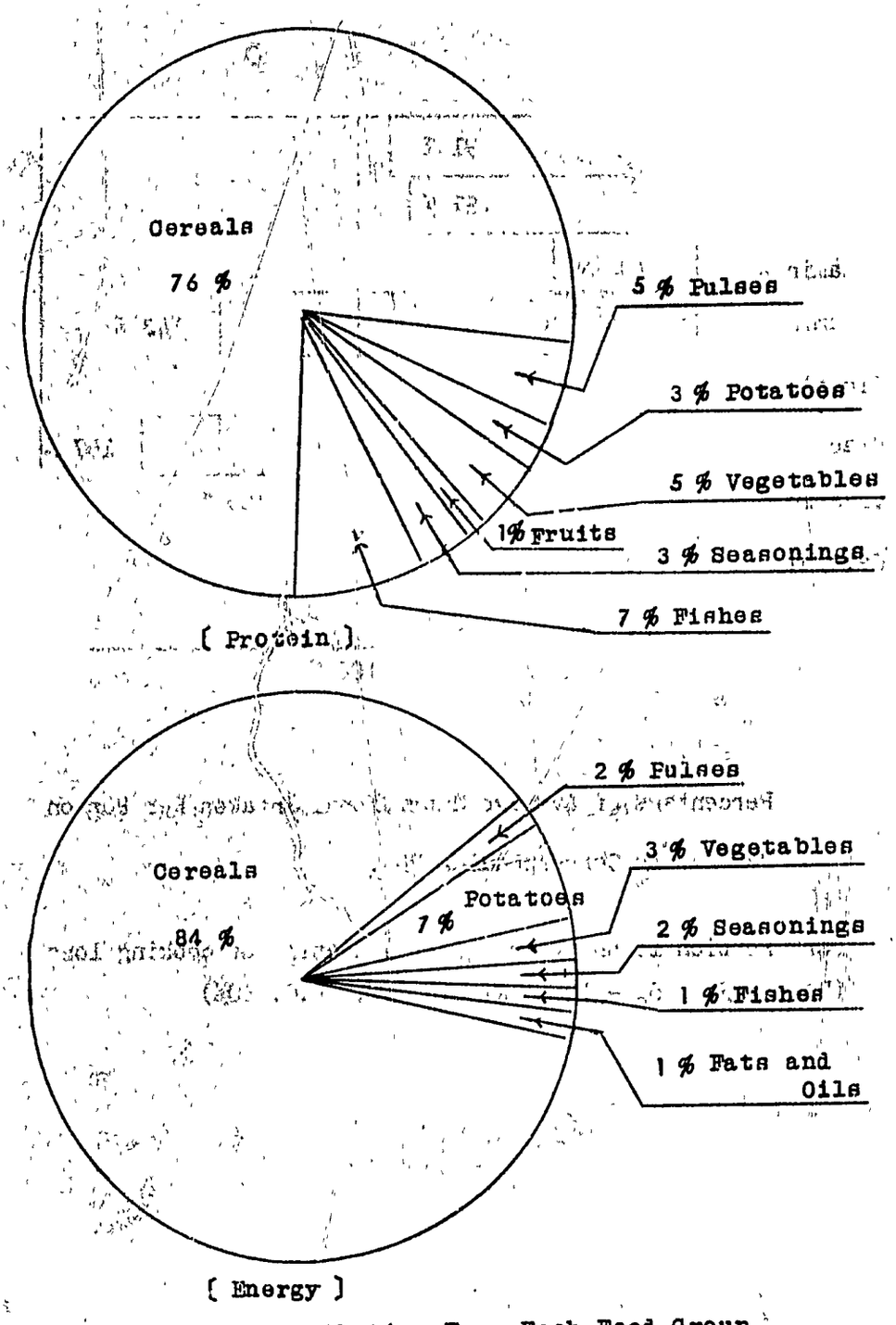

Fig 2, Percent Contribution From Each Food Group to Energy and Protein

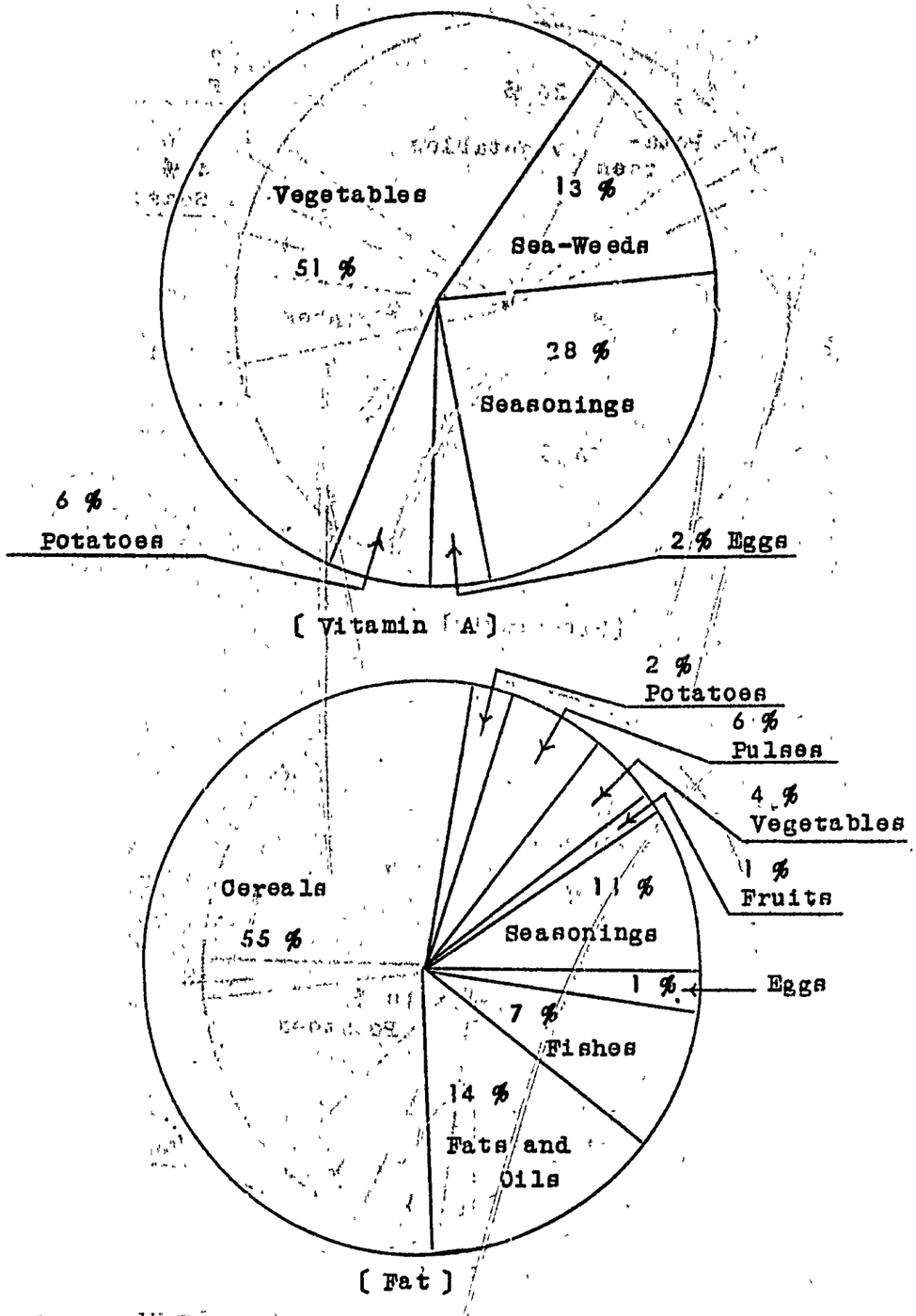

Fig.3. Percent Contribution From Each Food Group, A. to Vitamin A and Fat

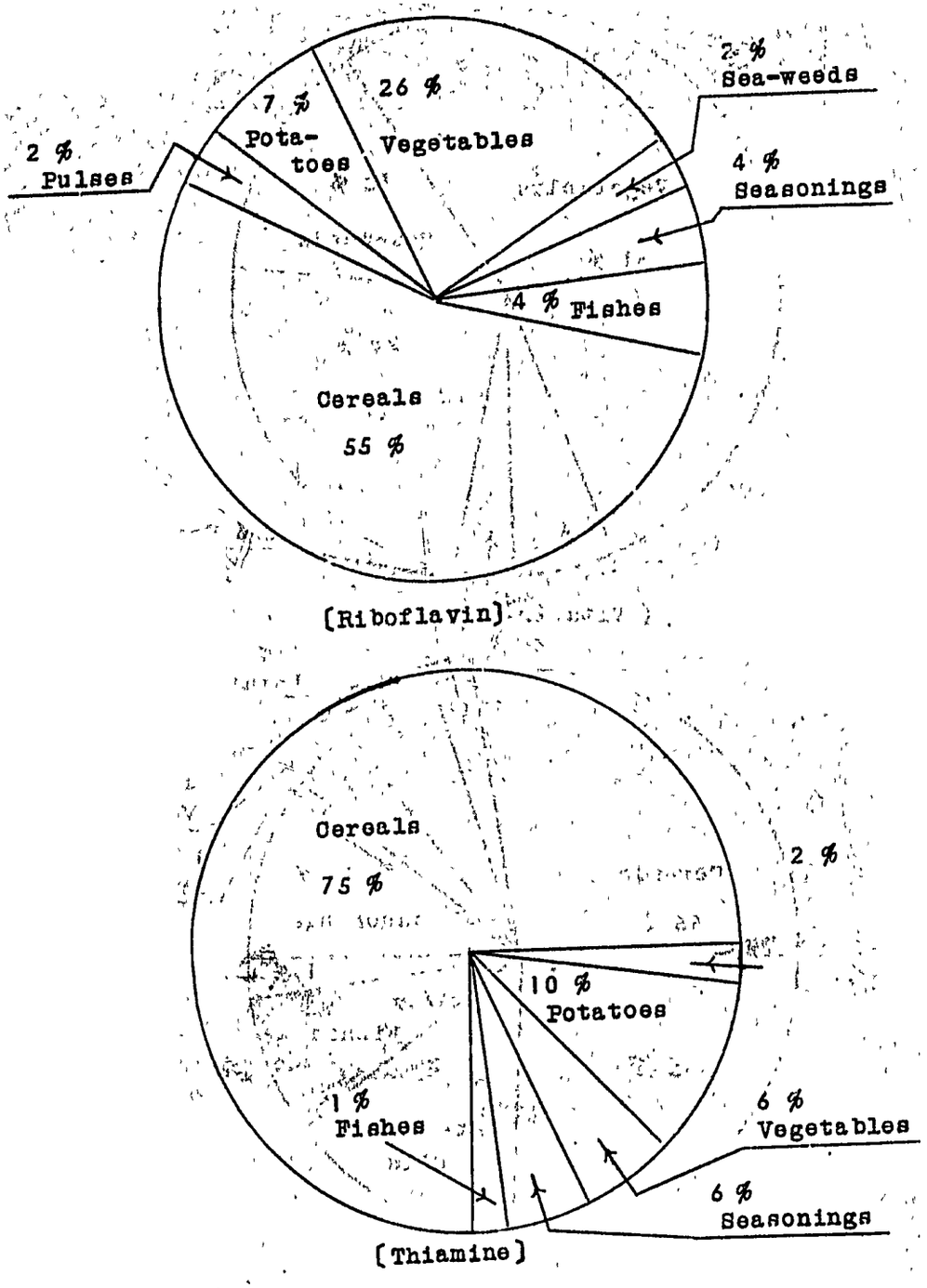

Fig.4. Percent Contribution From Each Food Group to Riboflavin and Thiamine

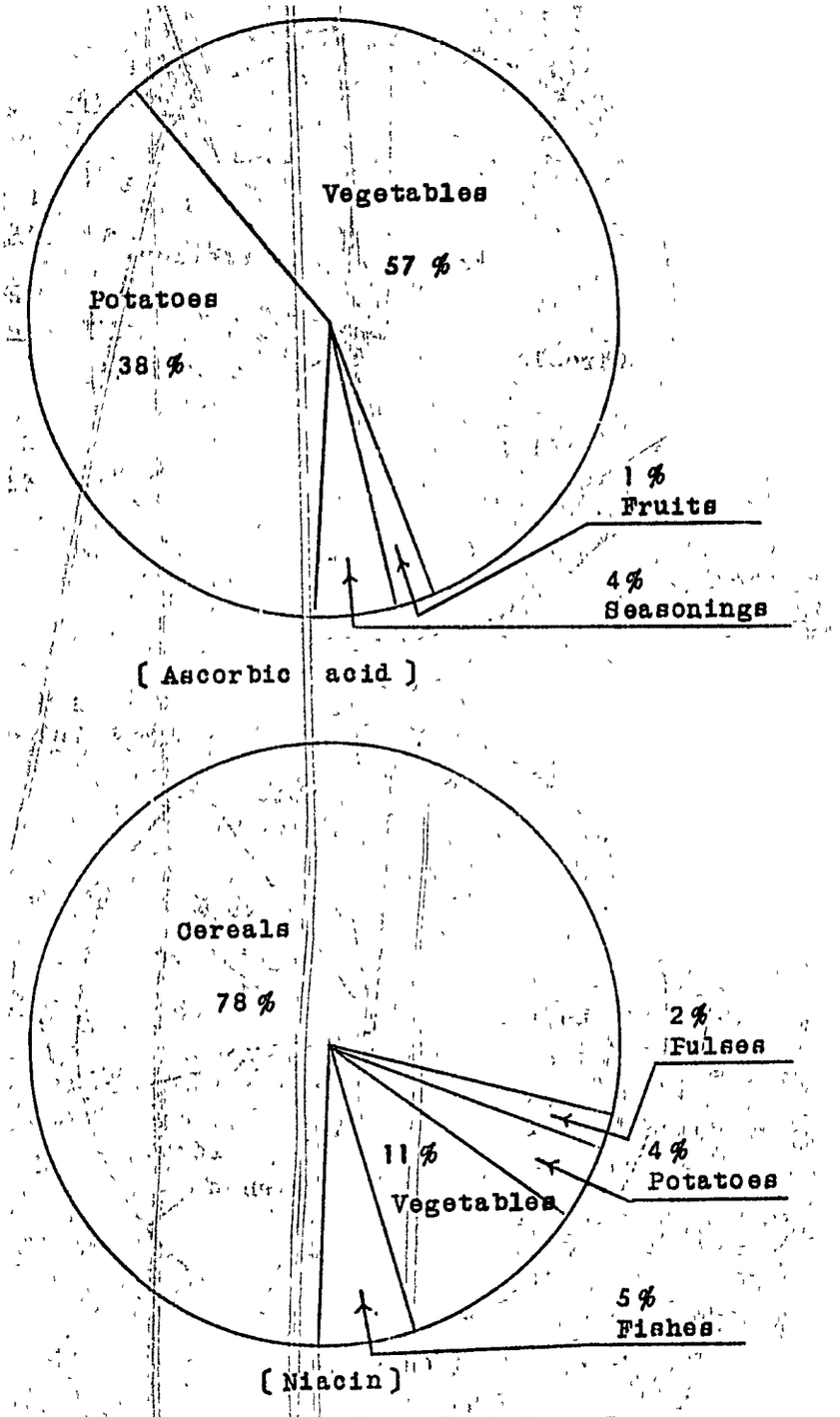

Fig.6. Percent Contribution From Each Food Group to Ascorbic acid and Niacin

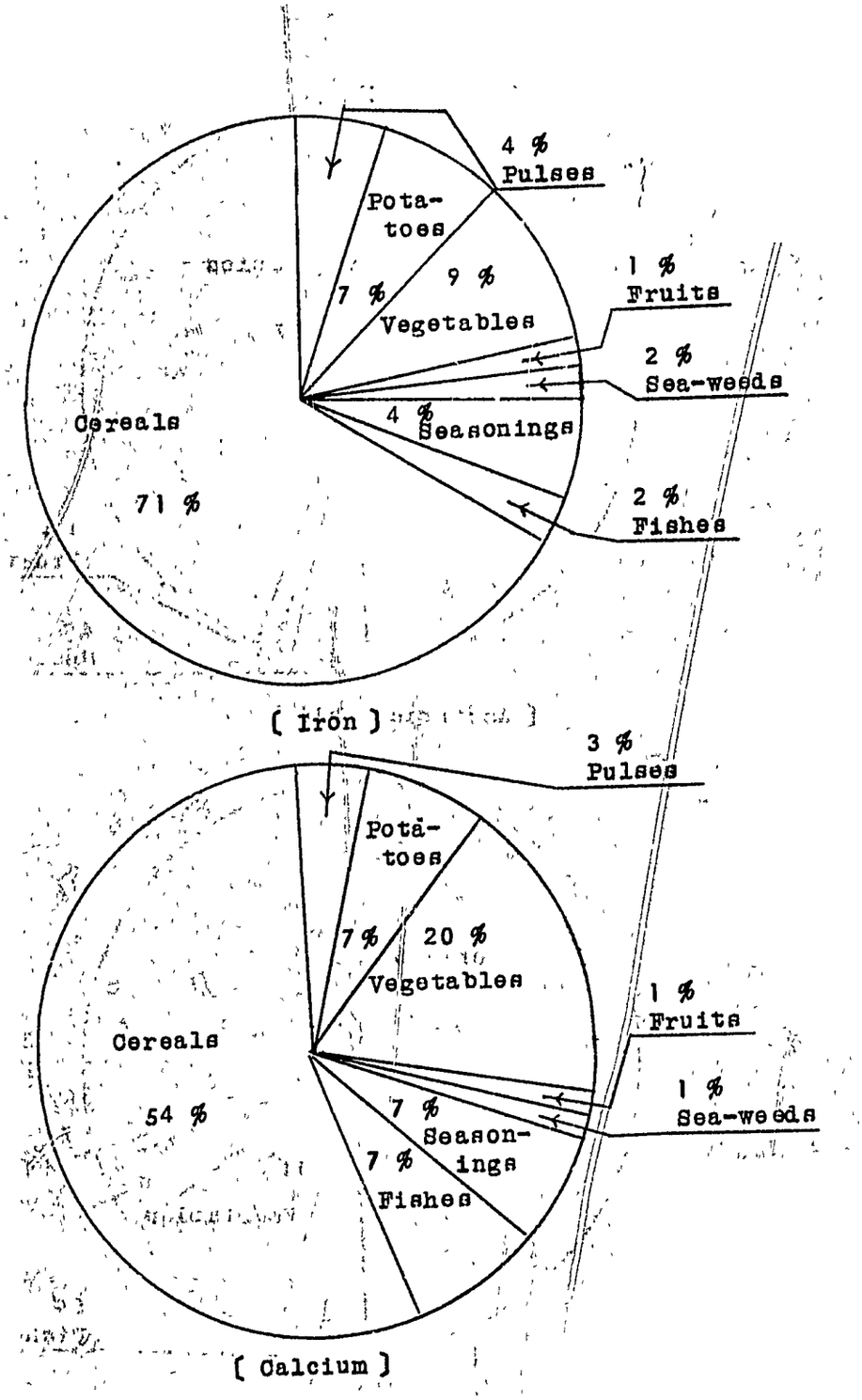

Fig.7. Percent Contribution From Each Food Group to Iron and Calcium

When average daily consumption of various food groups by rural resident was compared with the national average value reported by MHSA or with Food Balance Sheet shows that they fall all within reasonable range. But it is noted that intakes of pulses, vegetables and seasoning were considerably lower than these two reports (See Table 2).

The reason for this may be explained that the food expenditure data covered for six even number months were only analyzed.

This happen to leave out the months that prepare large quantity of preserved food that is Kimchi in November and Mae Ju in January. Kimchi is made of cabbages and other seasonings prepared in large quantity to last for 3, 4 months, while maejoo made of beans used for preparation of soysauce and bean paste to eat for whole year.

These two items very likely have affected the nutrient intake level of calcium and vitamin A resulting in lower intake than real.

Comparison of the average daily nutrients intake of rural resident obtained from the Farm Food Expenditure Survey with the national Nutrition Survey (MHSA), from food balance sheet, and other reported values is presented in Table 6.

It is very interesting to note that the values obtained from Farm Food Expenditure Survey are all very similar to others except for calcium and vitamin A which were much lower. The possible reason for this has been explained earlier.

We intend to analyze the data remaining six odd number months in future.

Table 6. Comparison of the Average Daily Nutrients intake of Rural Resident obtained from the Farm Food Expenditure Survey with other Reported Values.

Nutrient	From Farm Food Expenditure Survey	National Nutrition Survey (MHSA) rural	From Food Food Balance Sheet	Other Reported Values (rural)
Calorie(Kcal)	2,515	2,578	2,390	2,394-3,020
Protein(g)	71	76	71	58-80
Fat (g)	25	18	27	13-25
Calcium (mg)	287	487	495	413-583
Iron (mg)	9.8	17	15.5	10-18
Vitamin A(I.U)	919	5,530	2,779	2,085-6,143
Thiamine (mg)	2.07	1.50	1.50	1.09-1.59
Riboflavin (mg)	0.88	1.00	0.82	0.76-1.60
Niacin (mg)	29.6	17	23.5	14-21
Ascorbic acid (mg)	64.8	114	74	63-114

SUMMARY

(1) The farm food expenditure portion of the Farm Household Economy Survey conducted in 1976 by MAF was used in order to obtain an average daily nutrients intake of rural resident.

(2) The analysis of these data did provide the necessary dietary survey results.

(3) The result thus obtained compared well with the National Nutrition Survey of MHSA, food balance sheet and with other reported values.

(4) Calcium and vitamin A intake levels were unusually low compare to others, but this may be explained by analyzing whole 12 months data instead of 6 months.

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AN OVERVIEW OF RESEARCH ON THE NUTRITIONAL STATUS OF KOREANS*

One hundred and twenty eight published nutritional status studies in Korea were reviewed prior to the initiation of this project (see attached bibliography). The studies sometimes involved some type of clinical and biochemical evaluation but the majority of the studies were food consumption surveys of limited scope.

The Recommended Dietary Allowances (R D A) published by the Korean FAO association are generally used as guidelines or standards for nutrient intakes of healthy persons in Korea. These guidelines are revised periodically (1967, 1975) as more information on requirements becomes available. Because of these revisions, a diet considered inadequate by one standard may appear adequate by another. Therefore, it is important to know whether the dietary intake is being compared with the latest revision or with earlier one. However surveys covered here all used the 1967 RDA level.

A report of the national nutrition survey of food consumption of 589 households made by MOSHA in 1969 and released in

* Part of a study on nutrition supported by a grant to the Korean Statistical Association from the ROKG/USAID Health Planning Project.

1970(51)** covered Seoul and Kyong Ki Do and Choong Chung Do. Interviewers visited each house and weighed the food consummed in the house for 3 days. A general observation of the family's health was made. Amounts of food used in the households were, on the average, sufficient to provide the Recommended Dietary Allowances set by the Korean FAO for Calorie and Protein. However subsequent reports released by the MOSHA which covered different provinces each year pointed out an insufficient intake of Calorie, fat, Calcium, Vitamin B1 and B2.

However, an earlier village study made by Yu and Chai(74) in 1962, where 56 rural families were subjected to food consumption, physical, clinical and biochemical tests (along with parasitological examination), pronounced the nutritional condition of the village to be "generally good".

A nationwide food consumption survey conducted by the Research Institute of Medical Sciences of Korea in 1969, with 247 city households and 340 rural families, found the average daily food intake of city residents to be 1100g and that of rural folks to be 1300g. But the Calorie, Protein, fat, Calcium a nd Vitamin B2 intake were insufficient(59). When Yoo and Haw(73) conducted a food consumption survey in Kyung Ki Do, with 60 rural households, they also found the calorie, protein, calcium and vitamin B2 to be below the recommended level. It is generally agreed that one third of the total protein intake coming from animal sources can provide the best amino acid

** Number in parenthesis identifies study in attached bibliography.

requirement of the body. In all nutritional surveys conducted in Korea, it has been repeatedly pointed out that the Korean diet falls short of this animal protein requirement.

In a study of school children in Tae Ku and in a rural area near Tae Ku, made by Choi(6), city children were taller and heavier than rural school children of the same age. The students in the school lunch program in both areas were nutritionally better off than the students without the school lunch program.

Several dietary studies have shown that families as a whole had the lowest levels of intake for riboflavin, thiamine, vitamin A and calcium (38, 39, 40, 52, 55, 60).

The food balance sheet data provided annually by the Korean FAO association from 1962 indicate the increasing trends in food availability -- thus an assumption may be made that the apparent nutrient intake of the average Korean has been improved. The relationship between the availability of foods and nutritional state may be expressed in the following diagram:

Food Produced --> Food available in market --> Purchase income --> Food available in household --> Nutrients obtained by family --> Nutritional status of individual

The average monthly family income in cities and farm has been substantially increasing in recent years. As income rises, the food consumption pattern seems to be changing slowly (60). Urbanites tend to rely more on non-traditional food stuffs such as dairy products and processed foods. Very little increase in per capita grain consumption were observed in urban areas despite the increase in food expenditures. Relatively static trends have been observed in the farming areas.

Progress in developing economies has not always worked to redistribute income to the most disadvantaged. The change in food consumption patterns seen in urvanities may not reflect the urban poor worker's diet. For the first time in Korean history, the rural residents became a minority in 1975 as a result of steady and fast ruralurban migration. The large masses of rootless migrants who stream to Seoul are perhaps afflicted by malnutrition.

One nutritional survey on female factory workers (Ref.5) in Seoul reported the poor intake of most nutrients and reported the anemic condition of many workers.

One note on the change in food consumption patterns among the urbanites. Rural residents may emulate the city folks' diet in future, so it is extremely important to be aware of the fact that the major diseases that kill nearly half of the people in the industrial nations are the cardio-vascular diseases, myocardial infarction and arteriosclerosis. These diseases are very frequently traceable to overeating and to any of several nutritional imbalances.

The Korean Applied Nutrition Project, initiated in 1968 and directed by the office of Home Improvement of the office of Rural Development of the MOAF, has conducted a self-evaluation nutrition survey. When the program began in 1968, ten pilot villages in 9 provinces were selected and priority was given to the production and utilization of nutritionally valuable foods. The project has now expanded to cover 827 villages (out of total of 34,665 villages in Korea) and attained a very commendable degree of success. The self-evaluation survey on the pilot villages indicated a sufficient intake of total protein, calorie, calcium, iron, niacin, thiamin, and vitamins A and C. Only the riboflavin intake came out to be low.

Dietary evaluation studies on pregnant and lactating women are scarce. On these special population groups, general physical examinations have been conducted in relation to population or family planning programs, but these provided little information on nutrition.

To sum up, it is difficult to construct a picture of nutritional status in Korea with the information available. The number of studies has been limited and those which have been done cover only a small segmant of the population. Studies on lower income groups where nutrition is likely to be a pressing problem, need to be done. Moreover it is usually not possible to compare directly the results of one study with those of another. The definitions of levels of sufficiency are not always the same.

Individual records of dietary intake are subject to inaccuracies in estimating amounts and different perceptions of what is a sufficient intake. Another point is that only average values for the nutrient content of foods are given in the tables and actual amounts of nutrients in foods are subject to great variations due to season, geographical location and method of analysis. Quite often the nutrient value of food consumed by the Korean people has not been fully analyzed and one has to utilize the nutrient value of similar foods.

A record of three days or one weeks food intake will probably not be representative of the intake for the whole year. Since the dietary survey data vary widely--from nutritionally good for the average population to deficient in more than several nutrients, one can look at common nutrition-related indices such as the heights and weights of children and infant mortality data. The infant mortality rate was approximately data. The infant mortality rate was approximately 160 infants per 1000 live births died before the age of one year immediately after the Korean War. A decade later, the figure fell by half, and by 1975 the figure was again halved to about 40 per 1000 live births. The infant mortality rate is slightly higher in the rural areas.

The stature of the average Korean children has been steadily improving during the last two decades. The children in rural areas, however, are slightly shorter and lighter than the children of the same age in urban metropolitan areas. These and all other indices seem to indicate the overall

improvement of health in general and nutritional status in particular since the war. But the rural areas are slightly behind the urban population.

However, in spite of the short-comings, the available data do provide useful guides for interpreting nutrient intake within reasonable limits. Information collected from the surveys can be successfully used in forecasts and/or projections. The results can enable planners to assess the effects on food consumption of changes in socioeconomic and cultural factors which arise in the course of economic development. The information from these surveys form the basis of studies on income elasticity of demand and other influences on nutritional well being.

Studies are still needed which better represent the whole country. Nutritional studies on weaning children, pregant and lactating women are also urgently needed. Table 2 lists studies that are available on these special groups. The dietary study data, along with such information as mortality rates and anthropometric data, can with reasonable precision reflect the health and nutritional situation of the people and assist administrators to arrive at better decisions on nutritional policies and programmes.

In conclusion, the results of the various nutritional surveys vary widely. But available indices along with general trends of the results do indicate the following points:

1) The average Korean diet has been improving since the War.

2) Food consumption patterns seem to be changing slowly as income increases, but the rural residents may be lagging behind city dwellers.

3) Although recent studies have not reported any severe malnutrition cases, one can suspect that suboptimal conditions are more widespread than expected.

4) Data on the nutritionally vulnerable groups --- weaning children, pregnant and lactating women, the elderly and destitute --- are very scarce.

Table 1. Summary of nutritional studies conducted in Korea

Subjects	Location	Methods and analysis	Dietary evaluation and nutritonal status	Reference
247-Households city	nationwide	Questionaire and weighing	daily food intake city dwellers: 1100g rural " : 1300g	59
340-ruralarea			Below RDA in Caloria, Protein, Fat, Ca, B_2 intake	
368-HH City 80-rural 40-Fishery 61-Mountainous 40-Mining	Seoul Kyungki Do ChoongChung Do	Food consumption Survey, Clinical, Food economy	average caloric in take 2704 Cal. 73.4g Protein Below RDA in Calorie	51 1970 MHSA National Nutr. Survey
148-HH-city 214-rural 60-Fishery 101-Mountainous 20-Mining	Kangwon Do Chollado	"	2072 Cal. 75g Protein Below RDA in Calorie, Fat, Ca, B_1 B_2	51 1971
260-HH-City 340-Rural	Kyong Sang Do Cheju Island	"	2300 Cal. 70g protein Below RDA in fat, B_1 , B_2	51

Subjects	Location	Methods and analysis	Dietary evaluation and nutritonal status	Reference
60 HH	Wondang Myon KyongKi Do	3 days food consumption survey physical, clinical, and Biochemical Exams.	low in animal protein intake, Below RDA in Calorie, Protein, B2 A, Ca.	73 Yoo and Haw National Nutr. Survey (I)
56 HH-rural	Yusan Ri Yi Chun Koon KyongKi Do	Food consumption, Physical, Clinical, biochemical tests. chest X-ray parasitological exam.	Nutritional Condition of the village-generally good. 5.1% of total caloric intake from fat. Blood B_1 , B_2 is low in females. Parasitological infection.	74
267-Korean Athletes for olympic		food consumption survey with question aire form for one week	adquate in calorie, protein, A , B2 intake	55
288 HH from cities 349-HH from villages	Nation wide	Utilized secondary data	studies on food consumption patterr change in city and villages	60

Subjects	Location	Methods and analysis	Dietary evaluation and nutritonal status	Reference
490-men College	Suwon	one week weighing and Questionaire	men's intake were over RDA in all nutrients except B2, Women's intake were low in all but fe, Vit. C	
18 HH rural	Chollabuk Do	Weighing	Below REA in Protein, Ca. A, B2 no difference in nutritional status between model village and ordinary village	38-39
1482 subjects from 4 areas	mountainous-wonju Sea coast-Pohang City-Seoul Plain field-Kaejong	Home visits by interviewers for 3 days	Below RAD in Protein, Ca, A. B1, B2 C 2114-2311 Calorie 57-67g Protein	40 Lee
100-freshman in high school	Seoul	lunch pack Exam with Questionaire form	Below RDA Calorie, Ca. A, B2 and C	
403 High school girls	Seoul	lunch-pack examined	All but iron and Niacin was be low RDA only a few students were in terested in Nutrition	Lee 45

Subjects	Location	Methods and analysis	Dietary evaluation and nutritonal status	Reference
949 female factory workers in dormitory	Seoul	Weighing method for food consumption clinical, biochemical tests for 44 women	Below standard height Below RDA in Calorie, protein, fat, minerals and Vitamins Anemia	Cho 5
120 apartment residents	Seoul	Questionaire	Good nutrients intake	Kim 35
300 HH	Seoul	One week Questionaire	88% of all food eaten from vegetable 2840 Cal. 85g protein	12
48 army soldiers		food consumption, urine analysis Nitrogen balance	94% of the meal (770g) was rice + 0.067 N-retention	63
19 HH island in habitants	Chonnam Wando	Unterview with Questionaire form	Below RDA in Calorie, Protein, fat, A, B1 B2	Park 57
24 HH mountainous farming area	Chunbuk	3 days food consumption, weighing biochemical and clinical exam.	2446 Calorie 61.1g Protein Below RDA in Ca. B1, B2, Niacin C.	Ham 17

Subjects	Location	Methods and analysis	Dietary evaluation and nutritonal status	Reference
18-Women Sea-divers 24-Special area farmers	Cheju Do KangWon do	Interview with Questionaire form, Weighing.	good in take of all nutrients except B2 for sea-divers	Park 56
94-Buddhist monks	ChoongNam Soo Duk Sa	3 day consumption Weighing	no animal food eaten. all nutrients except carotene, niacin, Iron were low	

Table 2. On Children, Pregnant and Lactating Women

Subject	Location	Studies	Reference
120 infants	Seoul ChoongBuk Ansung Myun	Interview with monthers 65% had enough breast milk weaning started at 9-12MO. weaning foods-rice powder, rice	Cha 5
534-Children in School lunch program 456-without the program 1008-city school children	Taegu and village schools near Taeku	blood analysis city school children taller, heavier than rural school chieldren students in school lunch program	Cho 6
200-school children (5th graders)	Seoul	daily food intake record for 6 days	Yoo 39
174 rural women	Seohari Kyongki do	Interview 98% breastfed 40% weaned in one year 58% weand after 2 years	Cha 9
Review 1953-1972		Infant mortality rate in rural and Seoul area pregnancy outcome	Chung 17

Subject	Location	Studies	Reference
500 new born infants	Seoul Hospital	Records and Questionaire Analyses Weight of the new born infants of well nourished mothers were higher than poorly nourished ones	Kim 22

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Survey on Communal Feeding

(Questionnaire form in English translation)

Date: Year. Month. Day.

Name of Investigator:

Address: Do Gun Myun Ri

1. What is the size of the village?

   30 50 households

   50 70

   70 90

   Under 90

   Other

2. What percentage of these households is actually participating in Communal Feeding?

   all

   over 80%

   over 60%

   other

3. What is the size of the cultivated land in your village?

   village?

   rice paddy jung Bo

   Field "

   Total "

4. When do you operate the Communal Feeding?

   Rice planting season

   Harvesting

   Weeding

Village festivals

Others

5. When did you start the Communal Feeding?

Less than a year ago

1--2 years ago

2--3 years ago

Over 3 years ago

6. Who manages the Communal Feeding?

Sae Ma Eul Women's Club of Ag. Coop.

Life Improvement club of Office of Rural Development.

Cooperatively among above two clubs.

Other.

7. Where do you actually work for CF?

At field

Special building for CF

Center for Sae Ma Eul Women's Club

Village Mutrition Center of ORD

Other

8. What is the drinking water source you use?

Tap water

Pump

Well

Stream

Other

9. What kind of fules do you use?
   Wood
   Bracquett
   P. gas
   Electricity
   Other

10. Who participates in the CF?
   Cooperative farm workers only
   The workers and their family
   Whoever wants to participate
   Other

11. How many people eat at each meal?
   About 20 persons
   40
   60
   80
   Over 100

12. How many times do you eat a day at CF?
   Lunch only
   Snack and lunch
   Lunch and afternoon snack
   Breakfast - snack - lunch - snack - supper
   Variable

13. How many days do you have CF in a year?
   About 10 days
   10 - 20 days

20 - 30 days

Over 40 days

14. Who prepares the foods?

Hired worker

Women's Club members (rotational service)

One fixed member with helper

Other

15. What kind of assistance do you receive from the related agencies?

Building

Cooking facilities and untensils

Fules

Food expense

Personnel

Other

16. Who pays the expense for CF?

Employer of the day

Workers pay

Both worker and employer share the expense

Other

17. How the food materials are provided?

Participants bring some of the foods from home and purchase other items.

Manager purchase the needed materials from village fund first and share the expense afterwards.

All food materials are provided by the employer of the day.
Other

18. What do you think is most important point in meal planning for CF?
Nutritious food.
Accoustomed food.
Easy to fix.
Cheap food.
Other.

19. Mark the item that describes best of what you expect of CF program to be in future?
With more villagers had known about the CF.
Need to extend the CF operating days.
Will be good to affer foods to everyone during the busy season.
Would like to eat all meals at CF.
Need more convenient cooking facilities.
Need a refrigerator.
Need a trained guide in management, and menu Planning.
Other.

20. Write in numbers in order of importance you place on CF?
Saves food expense.
Can eat better.
Increases the effectiveness of the labor.
Wives can work longer at field.

Villagers cooperate better.

A good opportunity to learn about Nutrition.

Other.

DIETARY SURVEY ON PREGRANT WOMEN IN RURAL KOREA

Date _____ Year _____ Month _____ Day _____

Address _____ Do _____ Gun _____ Myun _____ Ri

Name _____

Size of Cultivated land Rice paddy _____ Pyung

Field _____ "

Total _____ "

Height _____ cm. Body weight _____ kg

Name of Investigator _____

Investigation

Date _____

FOOD INTAKE SURVEY

Time of intake (day, hour)	Name of Food eaten	Raw materials			Weight food after cook	Wt.of food eaten by each family member					Weight of left over
		Name	Customary unit	Weight (g)		Family	1	2	3	4	5
						Relation to subject					
						Age					

On family characteristics and food habits

1. Family constellation

Relationship with head of household	age	Educational level

2. How many months have you been pregnant ?

_____ month.

3. Do you have an experience with miscarriage ?

Yes _____ No _____

4. Any of your children died ?

Yes _____ No _____

5. Did you have a problem with food because of morning-sickness?

Yes _____ (from _____ month of preqnancy to _____ month)

No _____

6. If you, how was your food intake ?

____ ate normally

____ could'nt eat a particular food (name of the food _____)

____ could'nt eat most foods.

____ others.

7. Are there any food you avoid because of the pregnancy ?

Yes _____(name of food _____)

No _____

8. Are these any particular food you eat because of the pregnancy ?

Yes _____ (name of food _____)

No _____

9. Are you taking any Vitamine Pills ?

Yes _____(brand _____)

No _____

10. Whom do you consult your pregnancy related matters with ?

_____ alone

_____ husband

_____ midwife

_____MCH member (mother-child-health)

_____mother

_____mother in law

_____neighbor

_____doctor

_____other

11. Do you think dried small fish are particularly good for you during your pregnancy ?

Yes _____

No _____

Not sure _____

12. Which period of the pregnancy, does body require more nutrients ?

_____ initial period (3 Mon)

_____ middle (3-6 mon)

_____ last period (6-9 mon)

13. Do you think the baby will grow well if you eat as you like eating?

Yes _____

No _____

Don't know _____

14. Do you think you need to eat a bit less salty now because you are pregnant?

Yes _____

No _____

Don't know _____

15. What kind of food do you take the best while youre pregnancy?

_____

16. Have you started to drink milk since you are prognant ?

Yes _____

No _____

Survey on Family characteristics, Weaning Pattern,
Food habits of rural children in Korea

1. Family constellation

	Relationship	Age	Education
1.			
2.			
3.			
4.			

2. Did you give the colostrum to your baby?

Yes _____

No _____

3. If you didn't why didn't you ?

_____ did not look like a milk.

_____ baby did not take it.

_____ was told it is not good for baby.

_____ other.

4. What did you raise your baby with?

_____ mother's milk.

_____ cow milk.

_____ fortified powdered milk.

_____ dilute rice gruel.

_____ mother milk plus gruel.

_____ other.

5. If you are feeding other things to baby and not just milk; what is the reason?

_____ inadequate amount of milk.
_____ mother's disease.
_____ mother is busy.
_____ was told other food is better than mother's milk.
_____ other.

6. What was the first weaning food to your child?

_____ fruit juice.
_____ cows milk.
_____ soy milk.
_____ dilute rice gruel
_____ cookies.
_____ egg.
_____ steamed rice.
_____ prepared vegetables.
_____ other.

7. What are the other supplementary foods you gave most often to your baby ?

Name of food _____

8. Why did you give the supplementary food ?

_____ inadequate quantity of milk.
_____ to compensate some nutrients that are not enough with milk alone.
_____ as to initiate the weaning.
_____ because of another pregnancy.
_____ other.

9. At what month after delivery, has the quantity of milk decreased significantly in your case ?

_____ month after delivery

10. When did you wean your baby completely ?

_____ month

11. What is the food you give most often to your baby after the weaning.

Name of food _____

12. How often do you give these foods to your child ?

Frequency	___ times	___ times	___ times	Birthday,	Memorial-
Name of Food Name of Food	Daily	Weekly	Monthly	day etc. (Average Yearly)	___ times
Milk					
Soy milk					
Egg					
Bean paste					
Soup food					
Bean powder					
Beef					
Pork					
Fish					

13. Mark O if expressed right, and work X if wrong.

_____ milk is very good food to weaned child.

_____ powdered processed dry milk becomes like a cow's milk when dissolve in water.

_____ Noodle or bread are more nutritious than rice.
_____ children will grow well even rice, meat, fish, egg are given only and not the vegetables.
_____ bean is just as good food as meat or fish.
_____ it is better to feed children not too salty.

14. If you are not limited with money which food do you think is good to feed to children.
Name of food _____

15. What kind of food does your child like most ?
Name of food 1. _____
2. _____
3. _____

16. Why do you think be likes them ?
_____ because it is sweet.
_____ soft.
_____ appealing.
_____ very precious.
_____ is accoustomed with.
_____ smells good.
_____ are offered often.
_____ other.

17. What kind of food does you child dislike most ?
Name of food 1. _____
2. _____
3. _____

18. Why does he dislike them ?

_____ doesn't like the odor.
_____ doesn't like to chew.
_____ not accostomed with.
_____ not taste good.
_____ not appealing.
_____ other.

19. How do you feed your baby ?

_____ offer the same food other family eats.
_____ prepare specially for baby the food he likes.
_____ prepares nutritious food for baby.
_____ other.

20. Mother's attitude to what the baby woants to eat.

_____ let him eat only these foods he likes to eat.
_____ mother urges the child to eat nutritious food.
_____ punishes the child when he doesn't eat the nutritious food.
_____ other.

21. Do you give vitamin pills to your children ?

Yes _____ (brandname _____)
No _____

22. What is the most common illness your child encounter ?

Name _____